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TOWN OF PARADISE

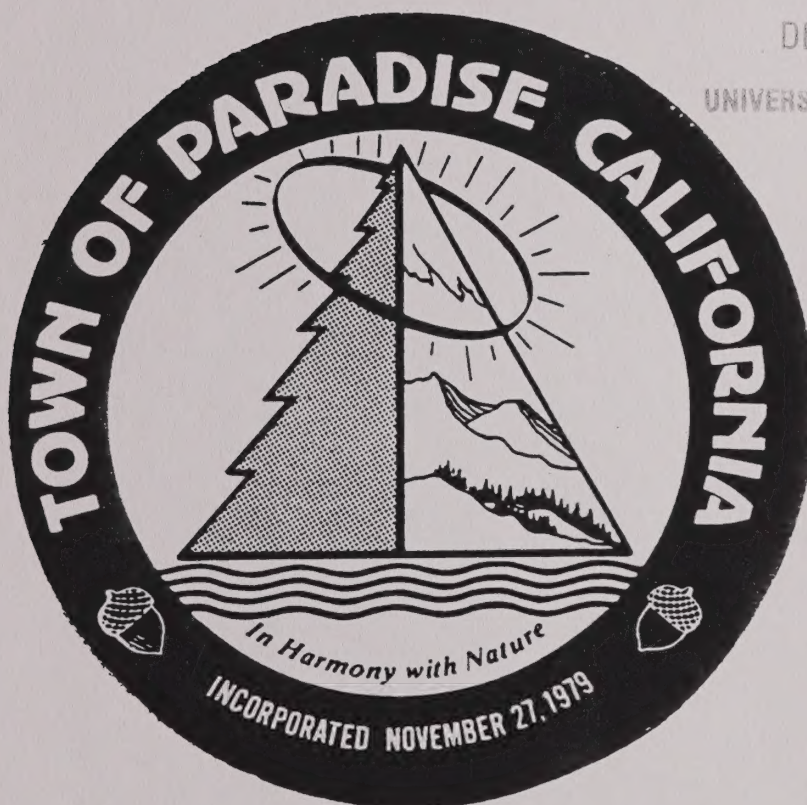
1994 GENERAL PLAN

VOLUME III ENVIRONMENTAL SETTING DOCUMENT

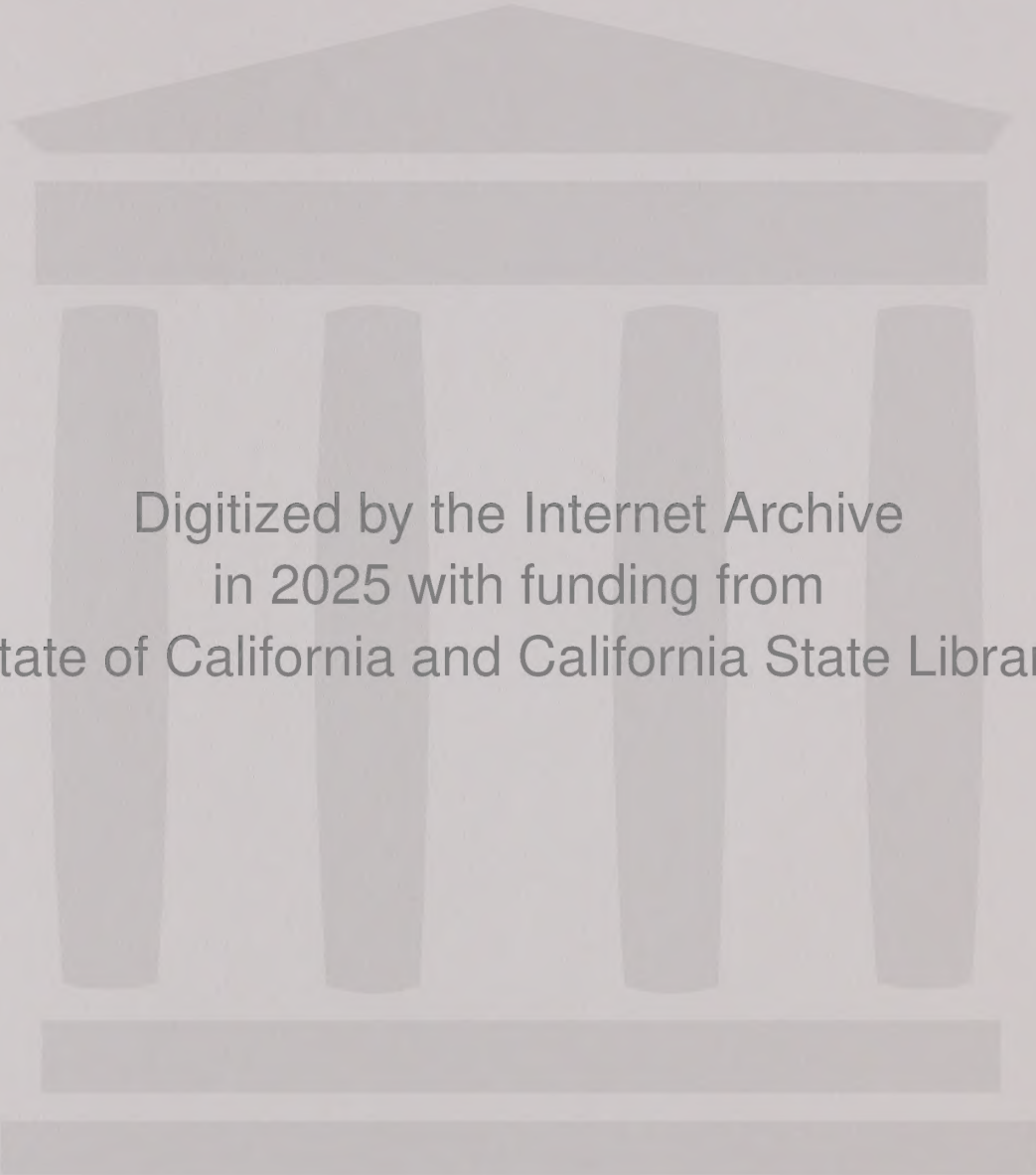
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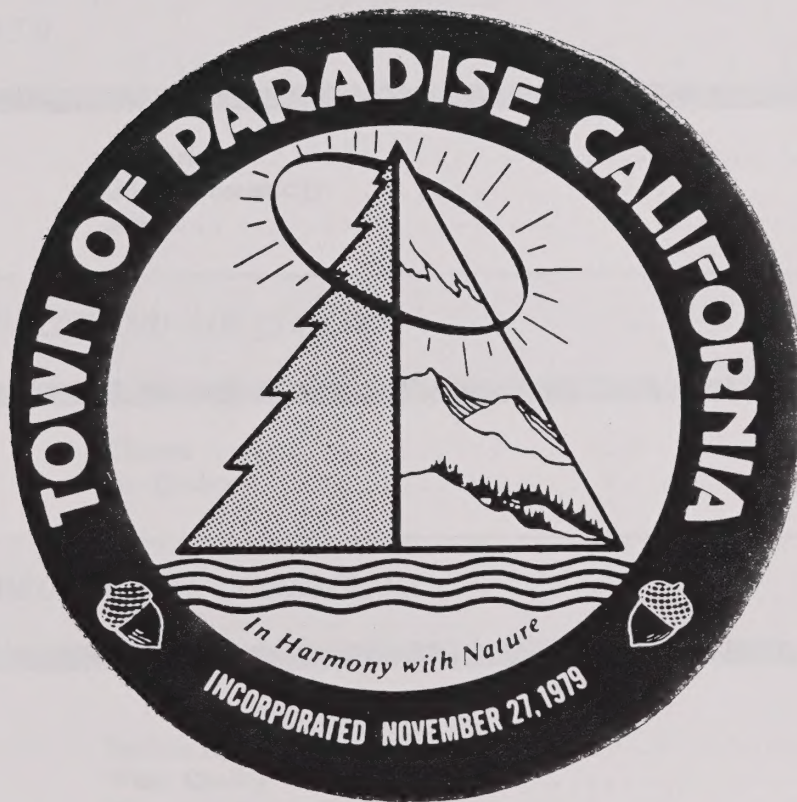
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TOWN OF PARADISE COMMUNITY DEVELOPMENT DEPARTMENT
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TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 TOWN HISTORY 4

3.0 EARTH 8

3.1	Topography	8
3.2	Geology/Seismicity	10
3.3	Soils	21

4.0 CLIMATE AND AIR QUALITY 30

4.1	Climate	30
4.2	Air Quality	35

5.0 HYDROLOGICAL CONDITIONS 42

5.1	Surface Hydrology	42
5.2	Water Quality	45
5.3	Town and District Responsibilities	48

6.0 VEGETATION AND WILDLIFE 49

7.0 NOISE**59****8.0 LIGHT AND GLARE****72****9.0 EXISTING LAND USE****73****10.0 RISK OF UPSET AND SAFETY****77****11.0 POPULATION****79****12.0 HOUSING****83**

12.1	Housing Profile	83
12.2	Housing Needs	88
12.3	Projected Housing Needs	106
12.4	Residential Land Resources	109
12.5	Development Constraints	110
12.6	Evaluation of the Previous Housing Element	117

13.0 TRANSPORTATION/CIRCULATION**125**

13.1	Street Classification System	127
13.2	Existing Levels of Service	134
13.3	Parking	140
13.4	Truck Routes	141
13.5	The Paradise Area Transportation Planning Model	143

14.0 PUBLIC SERVICES AND UTILITIES

144

14.1	Law Enforcement	144
14.2	Fire Protection	145
14.3	Solid Waste Disposal	149
14.4	Utilities	150
14.5	Health Services	151
14.6	Schools	152
14.7	Parks and Recreation	157
14.8	Water Service	162
14.9	Wastewater	165

15.0 SCENIC AND CULTURAL RESOURCES

168

16.0 RELATIONSHIP TO OTHER PLANS

174

16.1	Butte County General Plan	174
16.2	Spheres of Influence	182
16.3	Town of Paradise	183
16.4	Butte County Air Quality Plan	184
16.5	Butte County Hazardous Waste Management Plan	186
16.6	Butte County Airport Land Use Commission	188
16.7	Butte County Regional Transportation Plan/Congestion Management Program	189

APPENDICES

A.	Community Concerns Summary Report
B.	Partial Checklist of Butte County Wildlife
C.	Acoustical Terminology and Noise Measurement and Modeling Methodology
D.	Existing Traffic Conditions Data
E.	Land Use Guidelines for Safety Compatibility Only
F.	References
G.	Persons Contacted

LIST OF TABLES

TABLE NO.

DESCRIPTION

3-1	Significant Earthquakes Affecting Paradise Study Areas
3-2	Modified Mercalli Intensity Scale of 1931 (1956 Version)
3-3	Seismic Potential of Faults Affecting Paradise
3-4	Soil Symbols and Some General Characteristics of Soil Series Mapped
3-5	Soil Erosion Hazard Classifications
4-1	Annual Precipitation Totals for Paradise and DeSabra 1958-1989
4-2	Climatological Data Summary
4-3	Maximum Hourly Concentrations for Ozone
4-4	Maximum Hourly Concentrations for Carbon Monoxide
4-5	24 Hour Maximum Concentration for PM-10
4-6	Maximum Hourly Concentrations for Nitrogen Dioxide
7-1	Noise Contour Data - Distance from Center of Roadway to L_{dn} Contours
7-2	Summary of Measured Noise Levels and Estimated Day Night Average Levels in Areas Containing Noise Sensitive Land Uses
9-1	Existing Land Use Acreage Estimates
9-2	Comparison of Land Use Acreage
11-1	Historical Population Growth
11-2	Population Trends 1980-1990
12-1	Total Housing Stock 1980-1990
12-2	Residential Building Permit Activity 1985-1990
12-3	Total Dwelling Units by Type of Structure 1980-1990
12-4	Total Households 1980-1990

12-5	Average Number of Persons Per Occupied Dwelling Unit 1980-1990
12-6	Housing Tenure 1980-1990
12-7	Paradise Households Spending over 25 % of Gross Income for Housing
12-8	Housing Condition Survey Results Single Family Dwellings and Mobile Homes
12-9	Housing Condition Survey Results Multiple Family Dwellings
12-10	Overcrowding, 1980-1990
12-11	Elderly Population 1980-1990
12-12	Disabled Population 1980-1990
12-13	Large Families 1980-1990
12-14	Female Heads of Household 1980-1990
12-15	Basic New Construction Need by Income Group 1991-1997
12-16	Comparison of Quantified Objectives
13-1	Average Daily Traffic Volumes
13-2	LOS Criteria Signalized Intersections
13-3	LOS Criteria Unsignalized Intersections
13-4	Peak Hour Level of Service
14-1	Paradise Unified School District Enrollment vs. Capacity
14-2	Paradise Unified School District Enrollment 1978-79 Through 1990
14-3	Park and Recreation Facilities
14-4	State and Federal Parks and Recreational Facilities
14-5	Trails
15-1	Historical Structures and Landmarks

LIST OF FIGURES

FIGURE NO.	DESCRIPTION
-------------------	--------------------

1-1	Study Areas
1-2	Regional Location
3-1	Slope
3-2	Earthquake Epicenter and Faults
3-3	Soils
4-1	Sacramento Valley Air Basin
5-1	Special Permit Zones
5-2	Paradise/Magalia Reservoir Watershed
6-1	Bucks Mountain Deer Herd Boundary (Generalized)
6-2	Mooretown Deer Herd Boundary (Generalized)
6-3	Eastern Tehama Deer Herd Boundary
6-4	Deer Herd Ranges and Migration Corridors
7-1	Noise Monitoring and Calibration Sites
7-2	Distance to 60dB L _{dn} Contour Arterial Traffic
7-3	Paradise Skypark Airport Approach Zone
7-4	Paradise Skypark Airport
7-5	Community Noise Survey
7-6	Community Noise Survey
7-7	Community Noise Survey
9-1	Existing Land Use
13-1	Paradise Street System

13-2	Paradise Truck Routes
14-1	State Responsibility Areas and Fire Hazard Severity Zones
14-2	Paradise Unified School District Boundaries
14-3	Water Service Boundaries
14-4	Conventional Gravity System
16-1	Paradise Urban Reserve



ENVIRONMENTAL SETTING

1.0 INTRODUCTION

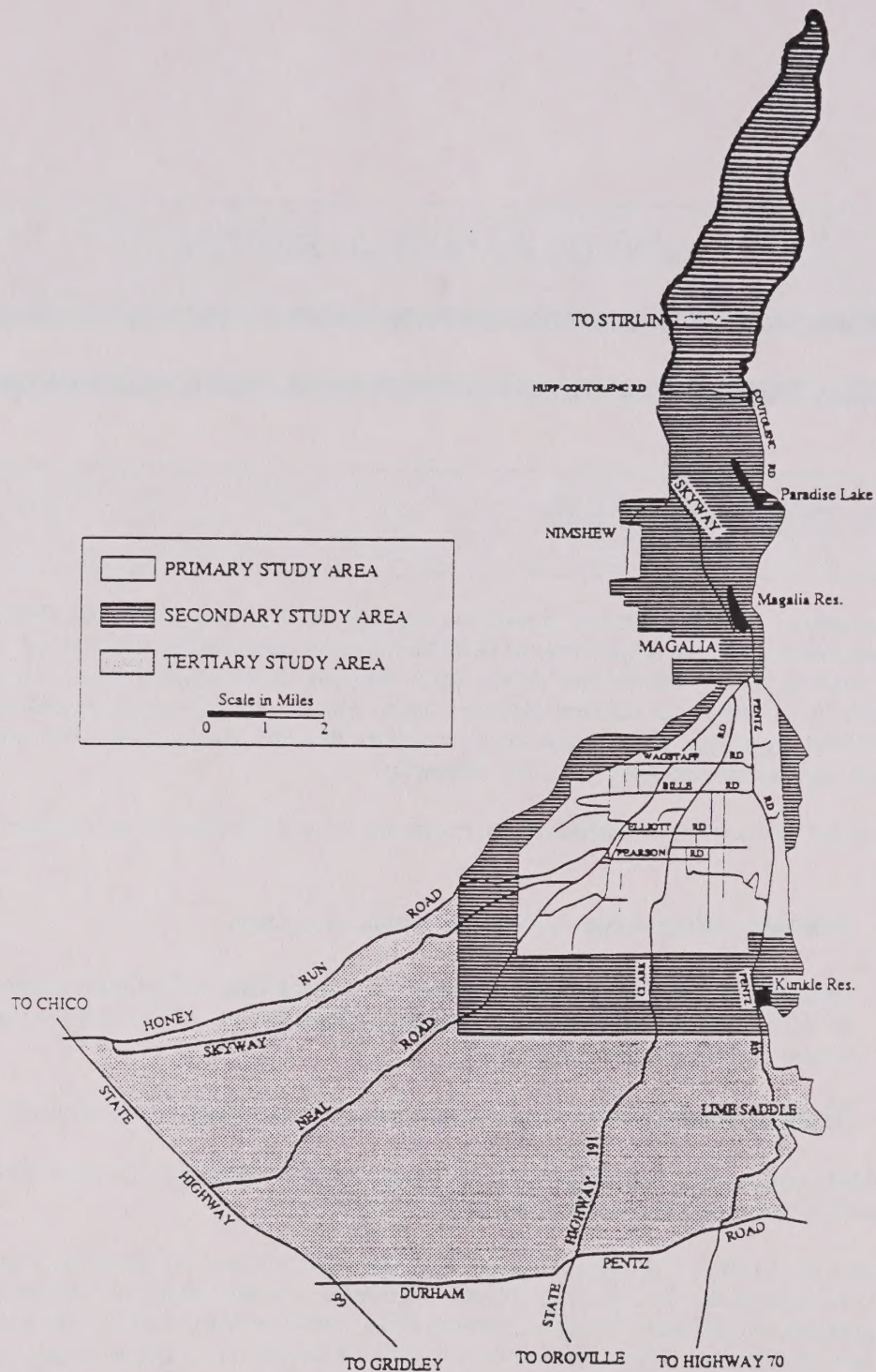
This document contains background information compiled for the Town of Paradise *General Plan*. The document addresses all the subject areas to be addressed in the plan and also serves as the "environmental setting" portion of the environmental impact report prepared for the *General Plan*. It also includes, as Appendix "A," a *Community Concerns Summary Report* which synthesizes comments collected early in the *General Plan* preparation process from the General Plan Revision Steering Committee, and responses to a citizens' opinion telephone survey of the community.

Three study areas have been established for the town and surrounding areas for the purpose of the *General Plan*:

- **Primary Study Area** - reflects the existing town limits
- **Secondary Study Area** - encompasses the existing Sphere of Influence adopted for the town by the Butte County Local Agency Formation Commission (LAFCo), and the Paradise/Magalia Reservoir watershed area to the north.
- **Tertiary Study Area** - extends to the south and west to Highway 99 and Durham-Pentz Road.

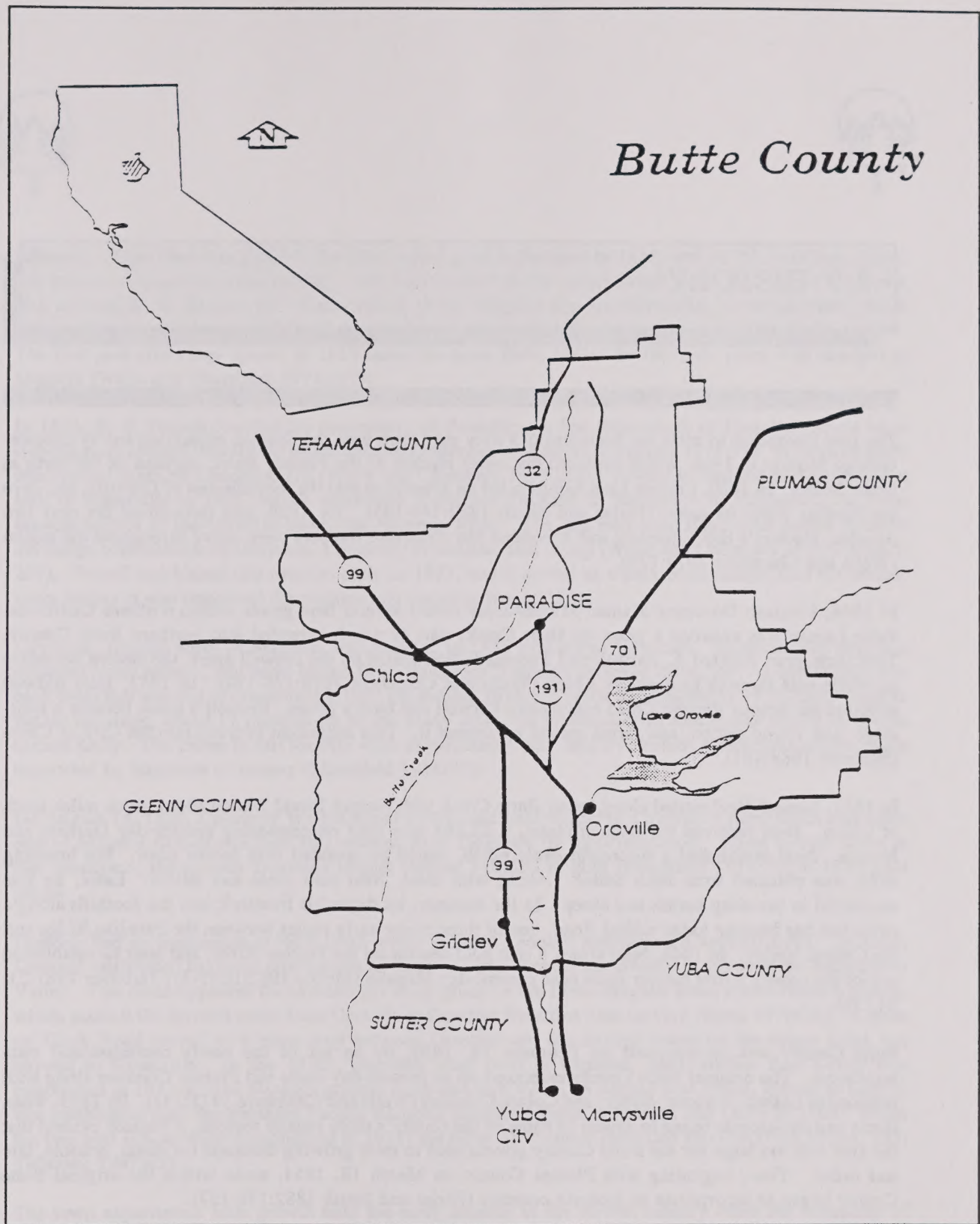
These study areas are shown on Figure 1-1. For purposes of this document, the term "study area" refers collectively to the primary, secondary and tertiary study areas.

The Town of Paradise, California is located in eastern Butte County, as shown on Figure 1-2, in the western foothills of the Cascade-Sierra Nevada Mountains. Located north of Paradise are the smaller unincorporated communities of Magalia, Paradise Pines, Nimshew and DeSabra; to the south of the Town is the Lime Saddle area. These areas are known as the Upper and Lower (Eden) Ridge, respectively. To the southeast is the City of Oroville (the county seat), and to the west is the City of Chico.



STUDY AREAS (GENERALIZED)

FIGURE 1-1



REGIONAL LOCATION

FIGURE 1-2



2.0 HISTORY

The first Europeans to enter the Sacramento Valley may have been the Spanish expedition led by explorer Gabriel Moraga in 1808, which explored the lower reaches of the Feather River, perhaps as far north as Sutter Buttes. In 1820, Captain Luis Arguello led an expedition into the foothills east of Oroville, and gave the Feather River its name (Fariss and Smith 1882:144-145). By 1828, and throughout the next two decades, Hudson's Bay Company and American Fur Company trappers were active throughout the region (Wells and Chambers 1973:128).

In 1844, Mexican Governor Manuel Micheltorena issued several land grants within northern California. Peter Lassen was awarded a grant on Deer Creek, part of which extended into northern Butte County. That same year, Edward A. Farwell and Thomas Fallon settled on the Farwell grant, the eastern boundary of which cuts through present-day Chico (Wells and Chambers 1973:128-129). In 1847, John Bidwell acquired his famous Rancho Chico estate from Farwell and built a house. Bidwell's estate became a mail, stage, and voting station, and farms sprang up around it. This settlement evolved into the City of Chico (Bancroft 1888:491).

In 1844, Samuel Neal settled along lower Butte Creek with partner David Dutton about seven miles south of Chico. Neal received the Esquon Grant, a 22,193 acre tract encompassing present-day Durham and Nelson. Neal established a successful cattle ranch, which he operated with Indian labor. His breeding stock was obtained from John Sutter. Along with meat, Neal sold hides and tallow. Later, he was successful in breeding horses and sheep. In the summer, he drove his livestock into the foothills along a route that has become today's Neal Road, one of three major early routes between the Paradise Ridge and the Central Valley. In 1848, Neal struck a rich gold deposit on the Feather River, and later he established one of the county's first lumber mills near present-day Magalia (McGie 1982[I]:35-37; Talbitzer 1987:21, 24, 38).

Butte County was incorporated on February 18, 1850, by an act of the newly commissioned state legislature. The original Butte County embraced all of present-day Butte and Plumas Counties along with portions of Lassen, Tehama, Sutter, and Colusa Counties (Wells and Chambers 1973:131). By 1853, when farms and settlements began to appear in some of the county's more remote regions, it became evident that the area was too large for the Butte County government to meet growing demands for roads, schools, law and order. Thus, beginning with Plumas County on March 18, 1854, areas within the original Butte County began to incorporate as separate counties (Fariss and Smith 1882:156-157).

It is thought that the first Euro-Americans to extensively explore Paradise Ridge (also known locally as Apple Ridge or simply "the Ridge") in the spring of 1850 were Abraham Decker, Sam McClellan, Sr., and Sam McClellan, Jr., who arrived in the vicinity of Dogtown (i.e., Magalia) about two miles north of the Town of Paradise. In the fall of that year, a man named Bassett built a cabin, and other settlers soon



followed. Tom Neal was possibly the first to find gold in the area in 1851, and by the next year, about 500 miners were active in this locality. Abe Folk opened the first store in fall, 1851, and one of the area's first settlers, E. B. Kinson, built a sawmill in 1852. Magalia was initially called Mountain View, but it became Dogtown in honor of Mrs. Bassett, who operated a thriving business selling dogs to the miners. The first post office was opened in 1857 under the name Butte Mills. In 1861, the name was changed to Magalia (Wells and Chambers 1973:252).

In 1853, R. P. Powell founded the community of Powellton, a few miles north of Magalia. There were rich diggings around Powellton, which attracted a number of miners (Mansfield 1918:73). A large sawmill was erected there by Charles Clark (Wells and Chambers 1973:259). Powell is credited with blazing the trail to Susanville in 1861, which eventually connected Oroville to Susanville by stagecoach on what became known as the Oroville-Susanville Humbug Road. The 160 mile-long stage road passed through the Ridge communities of Dogtown, Lovelock, Powellton, and Inskip (Wells and Chambers 1973:204-205, 259). Powell had blazed this route as early as 1853, and it served as a pack-mule freight trail for several years before it was improved for wagons and stagecoaches in 1861.

Lovelock, located north of Magalia, was founded in 1855 by George Lovelock. Excellent dry diggings attracted many miners, and some quartz (i.e. "hard rock") mining occurred there, too. A quartz mill was built there that was out of operation by 1882 (Mansfield 1918:73; Wells and Chambers 1973:260). Further yet up the ridge, about 17 miles north of the Study Area, the community of Inskip was settled by a man named Kelly. The mines in this locality were exceptionally rich, and five hotels, stores, and saloons were supported by hundreds of miners (Mansfield 1918:73).

On August 14, 1859, Chauncey Wright found a 54 pound gold nugget in a hydraulic mine about two miles east of Magalia (which was then still referred to as Dogtown by most residents). When melted down in San Francisco, the famous Dogtown nugget yielded \$10,690 in gold (Mansfield 1918:74) at 1859 gold prices.

Paradise had its beginnings around 1860, when William Leonard established a sawmill there. In 1865, Leonard established the route now known as Clark Road to connect his sawmill to towns in the Sacramento Valley. This route bypassed the exceedingly steep grade on the Pentz-Magalia Road above Pence's Ranch, which made it the favored route from Oroville to Paradise from that time onward (Estep 1970:26). A hotel on Clark Road served as a stage stop between Oroville and the mining towns on the upper ridge and beyond to Susanville. In the 1870s, churches were built in Paradise, and Paradise Post Office was established in 1877 in John Strong's general store on Clark Road. A second post office, known as Orloff, was established near the Southern Pacific Railroad Company depot at Pearson and Olive in 1905. When the two post offices were consolidated in 1911, the name of Paradise prevailed (McGie 1982[2]:234, 235; Talbitzer 1987:63).

The town experienced little growth until the early decades of the current century when the expansion of the lumber industry, construction of a railroad, and the formation of Paradise Irrigation District brought many new people into the area. Paradise became a center of commerce for many of the newcomers (Talbitzer 1987:78, 80).



The Ridge area received its first economic boost of the new century in 1900, when the Centerville Powerhouse and a power transmission line were completed within Butte Creek Canyon. De Sabla Powerhouse, located about seven miles upstream of the Centerville Powerhouse in Butte Creek Canyon, was completed by 1903. Water was diverted from the Feather River to increase the capacities of both powerhouses (Farber 1988; Mansfield 1918:352-353).

Diamond Match Company began to acquire about 55,000 acres on or near the Ridge in 1902. A huge sawmill, then one of the world's largest, was built in Stirling City in 1904. That same year, Butte County Railroad was built along Magalia Ridge to connect the sawmill at Stirling City to the match plant, planing and finishing mills in Chico. This railroad passed through Paradise, contributing to the growth of that community (McGie 1982[I]:184; Talbitzer 1987:80). In 1907, Southern Pacific took over operation of the railroad (Mansfield 1918:341, 359). The railroad gave renewed vitality to some of the old mining communities of the upper Ridge.

In 1914, about 400 people, mostly farmers, occupied Paradise. There was very little electricity, one telephone, no improved roads, two automobiles, no banks, and all of the water was supplied by wells. Paradise Irrigation District was organized with an initial bond issue of \$325,000 for the purpose of irrigating orchards and farms. Domestic drinking water was not initially provided. Nonetheless, the formation of PID led to rapid growth, and new orchards were planted (Mansfield 1918:367). The Magalia Reservoir was acquired from PG&E, and a new dam and distribution system were completed on February 16, 1918. The reservoir lies one-quarter mile from the Southern Pacific Railroad depot in Magalia (Mansfield 1918:348), which today serves as a restaurant.

In January 1921, a new Paradise Elementary School was occupied. One week later, it burned down. The next year, a new town hall was built near the site of the old one. In 1924, Paradise temporarily won a bitter battle with the Chico High School Board of Trustees, who then administered Paradise High School, to keep the school open. In the 1930s, however, Paradise, Magalia, and Stirling City high school students were bused daily to Chico. By 1927, Paradise Irrigation District served 11,250 acres producing pears, apples, walnuts, olives, and grapes. The same year, the Paradise Veterans Building was dedicated (McGie 1982[2]:9, 21, 23, 32, 36, 57).

One of the main events of the 1930s was the announcement of plans for a new road to Chico, later named the Skyway, to replace the narrow, winding Neal Road. In 1939, Paradise Elementary School again burned down (McGie 1982[2]:57).

In 1945, the Butte County Board of Supervisors voted to proceed with construction of the Skyway instead of upgrading and realigning Neal Road. The long awaited road was finally built. In 1948, ground-breaking ceremonies were held for Feather River Hospital, and in 1953, the Supervisors approved the widening of the Skyway to four lanes through Paradise (McGie 1982[2]:102, 103, 120).

Paradise Unified School District was formed in 1950, serving Paradise, DeSabra, Stirling City, and other outlying areas. By the middle of that decade, Paradise population reached around 8,000 people. A new Paradise Junior-Senior High School was built in 1954. To keep up with the town's steady growth, Paradise Irrigation District constructed a new dam to create the Paradise Reservoir above the Magalia Reservoir.



(By 1979, the water district would serve over 30,000 people.) As the 1950s proceeded, Paradise began to establish its identity as a retirement community. Between 1954 and 1959, the number of businesses in the town grew by 47.4 percent (McGie 1982[2]:123, 132, 133, 134, 175).

Paradise continued to grow during the 1960s, with new public works projects such as water mains and the widening of roads. A shopping center was built on the Skyway. Total school enrollment exceeded 2,600, and a second elementary school was constructed on Pentz Road (McGie 1982[2]:190, 196).

The Skyway was again widened through Paradise in the 1970s, and the town received a new library. A mid-decade drought was hard on the town, as the water supply severely waned. The crowning event of the decade was incorporation of the Town of Paradise in 1979 with over 20,000 residents in the new town limits. For two years, Paradise was the most populous town in the county, until it was overtaken by Chico (Talbitzer 1987:87). The widening of the Skyway to four lanes from Chico to Neal Road at the lower end of Paradise ushered in the 1980s (McGie 1982[2]:216, 224, 236, 266), during which time Paradise became a bustling, somewhat urban community with new shopping centers and other businesses along a widened Clark Road.

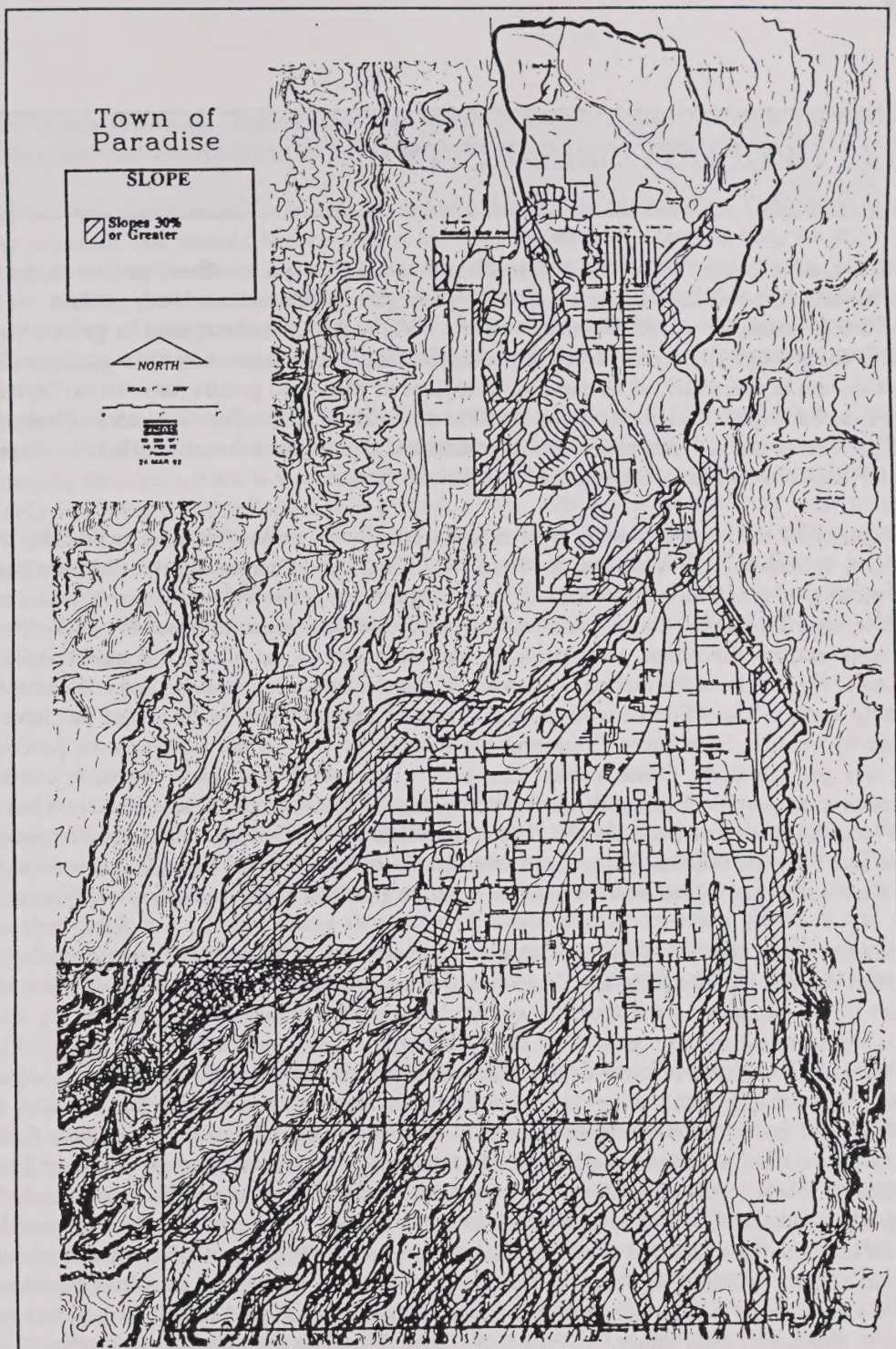


3.0 EARTH

3.1 TOPOGRAPHY

The Paradise area is located on the western flanks of the Cascade-Sierra Nevada mountain system. The general elevation above sea level ranges between 1200 feet in the most southerly portion of the tertiary study area to 2,200 feet to the northeast at Magalia; however, the extremes of local relief within the three study areas actually range between about 180 feet near the intersection of Highway 99 and Durham-Pentz Road to nearly 2,900 feet near the northerly portion of Coutolenc Road, above Paradise Pines. The primary study area is gently sloping towards the southwest with average slopes of around four percent, although steeper slopes occur to the west, adjacent to Butte Creek Canyon; to the east, along the margin of the canyon of the West Branch of the Feather River; and in localized stream incisions such as Berry Canyon and Clear Creek to the south. Steep slopes and marked slope breaks are uncharacteristic of the primary study area and nearly eighty-eight percent of the town sits on slopes of less than thirty percent, as shown on Figure 3-1.

Paradise occupies a large southerly trending ridge which generally ranges about 1,000 feet higher than the intervening steep canyons. Development has concentrated principally on south-sloping Paradise Ridge, which is defined by steep canyons: the West Branch of the Feather River drainage to the east; and the Butte Creek-Little Butte Creek drainage to the northwest. While some stream erosion has partially dissected the ridge surface, the overall aspect of this surface is one of generally rounded low hills and terrace-like low ridges. The major access roads to the community tend to follow the topography; however, the network of roads within the town is less influenced by topography.



SLOPE

FIGURE 3-1



3.2 GEOLOGY/SEISMICITY

The study area is located somewhat intermediate between the Cascade Geo-Province to the north and the Sierra Nevada Geo-Province to the south. The geologic characteristics of both systems are manifested in the terrestrial character of the Paradise region. While the Cascade system is primarily composed of Cenozoic (or geologically newer) volcanic rocks including Pliocene intrusives, the geologically older Sierra Nevada system is characterized by massive intrusions of Mesozoic granite into various layers of overlying rocks of varied origin. The geologic composition of the study area reflects a history of volcanism, tectonic uplift, periods of marine inundation, and erosional and depositional forces which have shaped the current character and distribution of the regional terrestrial strata.

The majority of the Paradise study area is underlain by Pliocene volcanics with those of the Tuscan Formation dominating the northern, southern, and southeastern areas; basaltic deposits encompassing a major portion of the town proper; and other geologic types including pre-Cretaceous deposits of Paleozoic undifferentiated rocks and marine sandstone and slate of the Monte De Oro Formation, Cretaceous marine sandstone, conglomerate, and siltstone of the Chico Formation, and more recent alluvium of the Modesto Formation, occurring in the western, northeastern, and southeastern portions of the Study Area. The Pliocene volcanics are several hundred feet in thickness but have been deeply trenched by erosion from Butte Creek and the Feather River. In the northwestern portion of Paradise (along the general Butte Creek stream channel), a narrow, bow-shaped extension consisting of pre-Cretaceous metamorphic rocks with small outcroppings of Mesozoic ultrabasic intrusives has been exposed by the erosional forces of Butte Creek. The coincidence of these varied localized formations of the Sierra Nevada and Pliocene volcanics associated with the Cascade system provides for considerable complexity in the local soil types of the western and northeastern portions of the secondary study area.

The Paradise study area is a portion of an area characterized as a westward downtilted fault block which underwent massive uplift during the Cretaceous period. Subsequent erosion of this block along with the adjacent thick volcanics of the Cascade system have created canyons and gold-bearing channels. This erosion has removed metallic gold from the metamorphic rocks and deposited it in gravelly streambeds. The gold mining ventures of the Paradise area correspond to the mining of these gravels. Ancient stream beds and surrounding areas were covered by volcanic outpourings during the Pliocene and exhumed somewhat later during more recent erosion by such streams as the Feather River, Butte Creek and Chico Creek, whose contemporary channels frequently intersect older stream channels lying atop the metamorphic formations. These processes, along with landslide and mudflow activities, have formed the present geological foundation of the study area which include volcanic rocks, metamorphic rocks, old gold-bearing channels and recently excavated deposits of sand and gravel. Other than the localized and heavily worked gold-bearing gravels, the Paradise region is not presently characterized as a heavily mineralized zone. There are no current mining operations in Paradise and the past gold mining period has ended, leaving numerous abandoned gold mines, including the Bader Mine, on the periphery of northeast Paradise.

The study area is located in an area of relatively low seismic activity and consequently has been accorded a category of low potential earthquake hazard (Geomechanics, 1980; Guyton and Scheel, 1974; *Butte County General Plan, Seismic Safety Element*, 1977). Such categorization must be made cautiously given the generally high level of seismicity for most parts of California and the location of Paradise within the



Cascade-Sierra Nevada Provinces. Paradise lies in an upland region whose very existence is due primarily to the active mountain-building processes of volcanism and uplifting along fault zones.

The only major comprehensive study of the earthquake hazard in northeastern California carefully considered the record of low seismic history against the need for accurate planning (Guyton and Scheel, 1974). The approach used in this study was to catalog all known earthquake activity by locating the epicenters of the quakes as well as the relative magnitude of each event. Although it was concluded that the past seismic history of a region is the most objective measure of possible future seismic activity, it is difficult to assess future earthquake activity since existing seismic risk maps of California are inadequate.

A more recent study of the seismicity of the Paradise area (Geomechanics, 1980) maps both the fault zones and the epicenters of earthquakes that have occurred near Paradise since 1934. There were fifty-four earthquakes ranging between 4.0 and 6.9 in magnitude on the Richter scale during the period 1934 - 1980. Of this total only five were of magnitude 6.0 or greater. Two earthquakes of relatively large magnitude have occurred relatively close to Paradise; the Ghost earthquake of February 8, 1940, with a magnitude of 5.7 and the Oroville earthquake of August 1, 1975, with a magnitude of 5.7. The former earthquake had an epicenter roughly twenty-five miles north-northeast of Paradise and the latter earthquake had an epicenter about twenty-four miles southwest of Paradise on the newly discovered Cleveland Hills Fault near Oroville (see Table 3-1).

Fault Zones

The Pacific tectonic plate is forcing itself under California and is moving north. This enormous pressure has caused upthrust faulting that has interrupted the old tertiary channels and stream beds. People in California generally are aware of major faults, such as the San Andreas fault. What is not generally understood is that California contains many thousands of minor faults. In some places in and around Paradise the tertiary channels are faulted as much as five or six times within one mile. Within the Paradise area there are many faults that can be identified and others that are believed to be in existence that have not located.

As the water percolates down these tertiary channels the flow is interrupted when the water encounters a fault. If the upstream portion of the channel is higher than the downstream portion, the water can, and sometimes does, cross the fault and continues in the lower (downstream) portion of the channel. Also, as sometimes happens the water will continue down the fault for many thousands of feet. If on the other hand, the downstream side of the channel is higher than the upstream portion of the channel this creates an underground dam. It is not uncommon for these underground dams to be many miles in length (thirty-sixty miles) and measure from just a few feet to several hundred feet in vertical upthrust. In some cases where there is a minor upthrust fault, the water may backup and cross over the fault, as crossing a small dam and continue percolating downstream. On larger upthrust faults of several hundred feet the water will either go down the fault for several thousands of feet, or if the fault is sealed at that point the water will follow the fault downstream until an opening in the fault is reached. At this point the water will again go down thousands of feet.

The fault zones that may produce seismic activity with an impact on Paradise are listed in Table 3-3 and indicated on Figure 3-2. The five known fault zones that could affect Paradise include the relatively short



Cleveland Hills fault, the Honey Lake fault, the Paradise fault, the Magalia fault and the Melones fault. The Paradise and Magalia faults are approximately six to seven mile fault zones which dissect the northeastern portion of the secondary study area. Although various researchers have disagreed over the relative extent and significance of the Magalia fault, more recent investigation and field surveys have indicated that the Magalia fault is geographically confined to the Magalia-DeSabra region (Dudley, 1988). While no historic evidence of surface displacement on these faults exists, some evidence suggests geologically recent activity along these faults (Dudley, 1988). The Melones fault zone is located roughly thirty-five miles east of Paradise. The fault is in excess of 200 miles in length and may represent a local segment of a more extensive central Sierra fault system. Most researchers accord the maximum credible earthquake along the Melones fault zone to be of magnitude 8.15 - 8.25 on the Richter scale, a range similar to the extensive San Andreas fault zone located over 130 miles to the west. A short fault approximately sixty miles east of Paradise, the Russell Valley fault, has not produced earthquakes affecting Paradise.

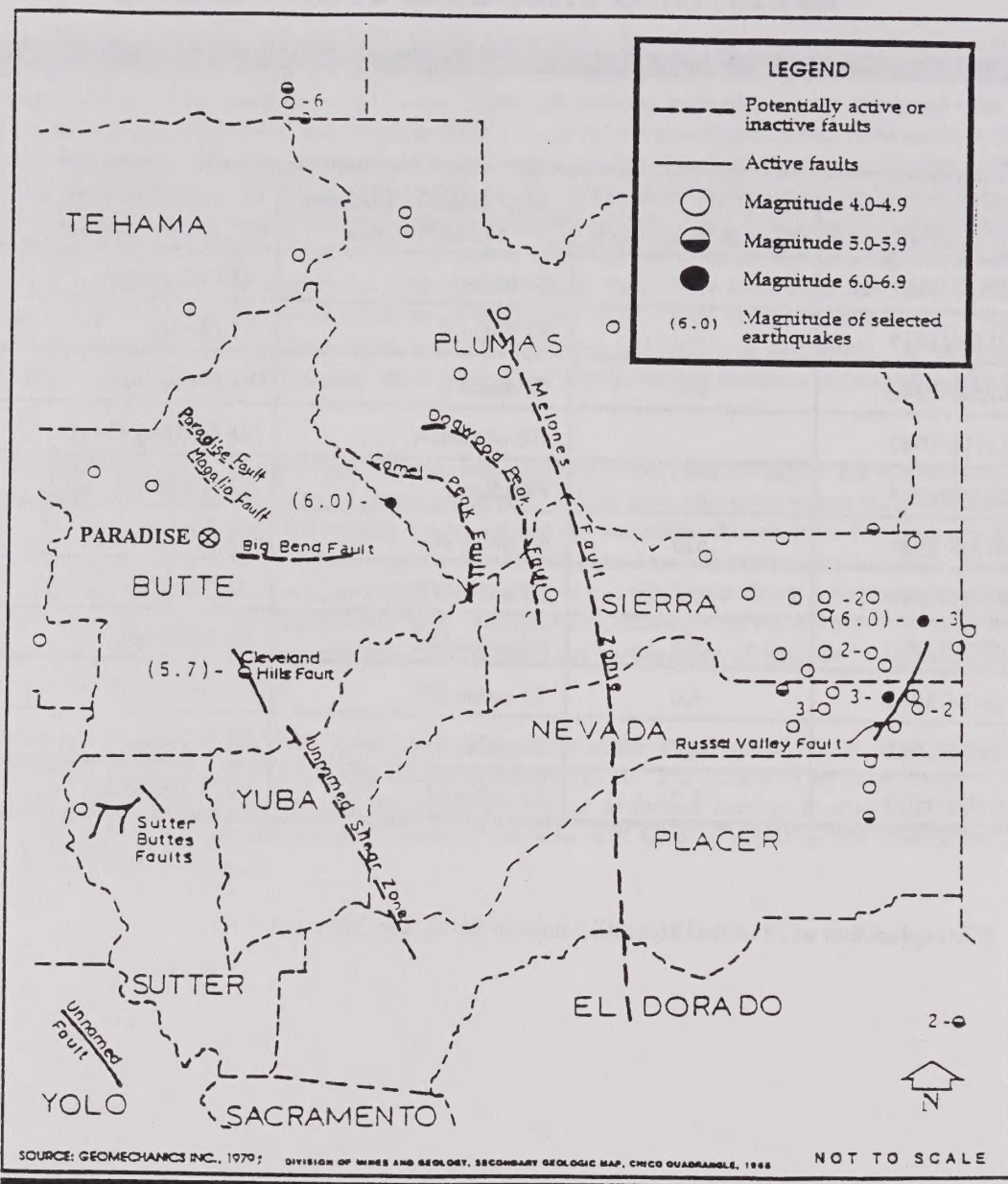
These data indicate that, for the most part, known fault systems in the Paradise region are somewhat short and are unlikely to yield earthquakes of large magnitude. While long and quite active fault systems are located in the northeastern California region, these systems are somewhat distant from Paradise and have not caused large earthquakes within historic times. Previously unknown fault zones may, however, produce locally damaging earthquakes, or a large magnitude earthquake could occur along a major regional fault zone such as the Melones or the Honey Lake fault. Additionally, although the Paradise and Magalia faults within the study area are considered inactive, the potential for earthquakes of unknown magnitude along these fault zones is not quantifiable.

The Paradise *Multihazard Disaster Plan* states that earthquakes of the magnitude of 6.9 on the Richter scale should be anticipated and considered when designing hazard plans. The effects of an earthquake will be further aggravated by aftershocks and by the secondary effects of further damage to structures, fires and possible landslides. The time of day and season of the year will have an effect on the overall damage throughout the Town of Paradise.

TABLE 3-1
SIGNIFICANT EARTHQUAKES
AFFECTING PARADISE STUDY AREAS

Date	Richter Magnitude	Approximate Location From Paradise	Modified Mercalli Intensity ¹
12/27/1869		Oroville	VIII (Oroville)
01/24/1875		20 miles S	VI (Butte)
02/08/1940	5.7	10 miles S	VI (Paradise)
11/18/1942		NE of Chico	VI (Stirling City)
04/20/1945		Paradise	VI (Paradise)
07/07/1946	5.0	48 miles NE	VI (Mill Creek)
08/21/1949	4.5	24 miles NE	IV (Butte)
03/20/1950	5.5	30 miles NE	V (Paradise)
05/24/1966	4.6	22 miles SE	
04/29/1968	4.7	61 miles SW	VI (Chico)
08/01/1975	5.7	24 miles SE	IV-V (Paradise)

¹ For explanation of Modified Mercalli Intensity Scale, see Table 3-2.



EARTHQUAKE EPICENTER AND FAULTS

FIGURE 3-2

TABLE 3-2
MODIFIED MERCALLI INTENSITY SCALE OF 1931
(1956 version)

I.	Not felt. Marginal and long-period effects of large earthquakes
II.	Felt by persons at rest, on upper floors, or favorably paced.
III.	Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
IV.	Hanging objects swing. Vibration like passing of heavy trucks or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rock. Windows, dishes, doors rattle. Glasses clink. Crockery clashes. In the upper range of IV, wooden walls and frames creak.
V.	Felt outdoors, direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.
VI.	Felt by all. Many frightened and run indoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knick knacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small bells ring (church, school). Trees, bushes shakes visibly, or heard to rustle.
VII.	Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to masonry D including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices also unbraced parapets and architectural ornaments. Some cracks in masonry C. Waves on ponds; water turbid with mud. Some slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.
VIII.	Steering of motor cars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.
IX.	General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. General damage to foundations. Frame structures not bolted, shifted off foundations. Frames cracked. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In alluviated areas sand and mud ejected, earthquake foundations, sand craters.
X.	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.

XI.	Rails bent greatly. Underground pipelines complete out of service.
XII.	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.

Masonry A, B, C, D. To avoid ambiguity of language, the quality of masonry, brick or otherwise, is specified by the following lettering.

- Masonry A. Good workmanship, mortar, and design, reinforced especially laterally, and bound together by using steel, concrete, etc., designed to resist lateral forces.
 - Masonry B. Good workmanship and mortar, reinforced, but not designed in detail to resist lateral forces.
 - Masonry C. Ordinary workmanship and mortar, no extreme weaknesses, like failing to lie in at corners, but neither reinforced nor designed against horizontal forces.
 - Masonry D. Weak materials, such as adobe, poor mortar, low standards of workmanship; weak horizontally.
- ¹ Original 1931 version in Wood, H. O. & Naumann, F. 1931. Modified Mercalli intensity scale of 1931 *Seismological Society of American Bulletin* v 53 No. 5 p 979-987.
- ² 1956 version prepared by Charles F. Richter in *Elementary Seismology*, 1958 p 137-138. W. H. Freeman & Company

TABLE 3-3
SEISMIC POTENTIAL OF FAULTS AFFECTING PARADISE

Source of Ground Motion	Maximum Credible Earthquake	Distance from Site (miles)	Maximum Anticipated Bedrock Acceleration (g)	Predominant Period of Motion (bedrock)	Duration of Shaking (seconds)	Remarks
Camel Peak Fault (46± miles long)	7.4	20	.26	0.35	30	Inactive
Cleveland Hills Fault (3± miles long)	6.5	24	.16	0.45	18	Active
Unnamed Shear zone along front of Sierra Nevada	7.2	25	.20	0.35	30	Apparently Inactive
Melones Fault Zone (200± long)	8.25	34	.23	0.48	50±	Potentially Active
Unnamed fault near Nelson (15± miles long)	6.1	15	.18	0.25	12	Inactive
Sutter Buttes Faults (6 small faults; 2-9 miles long)	5.4 - 5.8	39	.07	0.27	10	Potentially Active
Unnamed fault near Dunnigan (14± miles long)	6.7	66	.05±	0.43	20	Potentially Active
Midland-Sweitzer ¹ (80± miles long)	7.7	69	.07	0.55	25	Partially Active
Coast Range Thrust ¹ Zone (200± miles long)	8.25	51	.15	0.55	60	Inactive

Source of Ground Motion	Maximum Credible Earthquake	Distance from Site (miles)	Maximum Anticipated Bedrock Acceleration (g)	Predominant Period of Motion (bedrock)	Duration of Shaking (seconds)	Remarks
Big Bend Fault (14± miles long)	6.7	2	.67	0.30	20	Inactive
Willow Fault ¹ (30± miles long)	7.2	30	.16	0.35	30	Inactive
Dogwood Peak Fault (48± miles long)	7.4	26	.18	0.36	30	Inactive
Honey Lake Fault ¹ (32± miles long)	7.4	70	.07	0.50	30	Potentially Active
Hayward-Calaveras, Concord, Healdsburg-Robers Creek and Green Valley Faults ¹	7.6±	100 - 120±	0.5±	0.70±	35	Active
San Andreas Fault Zone ¹ N Section (200+ miles long)	8.25	130+	0.5	0.90±	70	Active
Russell Valley Fault	6.5	80	.05	0.4	18	Active
Paradise Fault (4.5-8 miles long)	NA ²	6.5	NA	NA	NA	Inactive
Magalia Fault (4.5-8 miles long)	NA	3	NA	NA	NA	Inactive

Source: Geomechanics, Inc., 1979; Division of Mines and Geology, Secondary Geologic Map, Chico Quadrangle, 1965.

¹ Not depicted on Figure 3-2; too distant from Paradise

² Not available



Landslides

According to the draft *Energy, Natural Resources, and Recreation Element* (1989), in Butte County, landslides frequently occur on slopes greater than fifteen percent, while slopes between five and fifteen percent exhibit very few landslides. Map III-1 of the *Butte County Safety Element* (1977) depicts relative amounts of landslide unit risk. Paradise and the surrounding study area are rated as having a low landslide potential. It is noted that detailed analysis of the complex interrelationships between the governing factors is needed to predict the stability of a specific area, and detailed on-site investigations are recommended to assess site-specific risks. Seismic shaking greatly increases landslide potential. The *Multihazard Disaster Plan* reports that the Feather River Canyon slope, along the northeast boundary of the town, has a lot of shale and appears unstable when disturbed.

Subsidence

The primary cause of subsidence in Butte County is groundwater withdrawal, according to the draft *Energy, Natural Resources, and Recreation Element*. However, areas of potential subsidence in the county are confined to the valley floor and include local areas of heavy groundwater withdrawal and several producing gas fields. These areas are illustrated in Map III-1 of the *Butte County Safety Element*, and the areas with the greatest subsidence potential extend about two miles north and south of Chico and in a one-mile radius around Gridley. Therefore, it is reasonable to assume that the potential for ground subsidence within the study area is low.

Liquefaction

Liquefaction occurs when there is a sudden but temporary increase in the fluid pressure between the soil grains, caused when the weight of the overlying soil or structure is temporarily supported by the water and not the soil grains. Map II-2 of the *Butte County Safety Element* illustrates areas of low, moderate and high liquefaction potential. The Paradise study area has been determined to have a generally low potential for liquefaction because of the soil's diverse particle size. The *Butte County Safety Element* cautions that the map must be considered approximate and invalid for direct determination of liquefaction potential on a specific site.

Dam Inundation Hazards

According to the draft *Butte County Energy, Natural Resources, and Recreation Element* (1989), there are currently twenty-four dams in Butte County which are under the jurisdiction of the California Division of Dam Safety. Two of these dams are above the Town of Paradise, within the secondary study area, on Paradise and Magalia reservoirs on Little Butte Creek. These dams are inspected annually by the state. Because there are no known geologic hazards in the vicinity, and the dams are inspected annually, it is reasonable to conclude that dam inundation hazard is low.



Volcanics

Mount Lassen, located approximately twenty-three miles north of Butte County, is considered to be one of the few active volcanos in the continental United States. According to the draft *Energy, Natural Resources, and Recreation Element*, while geologic hazards do exist in the Lassen Park area, the possibility of mudflows, flowing avalanches, or volcanic ash endangering Butte County is very remote, based upon historical and geological data.

According to the *Paradise Multihazard Disaster Plan*, though most of the eruptions in the Lassen Peak area have been small, it is believed that these volcanoes are capable of much larger eruptions, similar to those at Mount Saint Helens. A repeat eruption could be expected within the next one hundred years, with the severity still unknown at this point. The Town of Paradise may be within the range of ashflow or ashfall of such an eruption.



3.3 SOILS

Recent U.S. Department of Agriculture, Soil Conservation Service soil survey data for Butte County is not available. The USDA Bureau of Chemistry and Soils conducted a soil survey of portions of the county in the 1920s. The *Soil Survey of the Chico Area, California*, published by the USDA-BCS in 1929, classifies the majority of the primary and secondary study areas as Aiken clay loam soils and much of the surrounding areas as "scabland" and "rough broken and stony land."

The California Department of Forestry, in cooperation with the USDA Soil Conservation Service and National Forest Service, has conducted extensive photo interpretation and field surveys to compile comprehensive soil-vegetation maps for areas throughout numerous counties statewide, including those in the Paradise study area. The following discussion is based primarily on information developed through that program.

The complex geologic character of the Paradise area is reflected in a varied and even more intricate soil composition. A total of thirty-three distinct soil series comprise the primary and secondary study areas, with fifteen and thirty different series in each area, respectively. Soils of the Aiken series dominate the primary and northern portion of the secondary study areas. Soil composition is more complex and variable adjacent to stream channels of the Little Butte and Middle Butte Creeks (reflecting erosion and exposure of distinct parent materials). The southern third of the primary study area and the southern portion of the secondary study area are composed of differing soil types and dominated by soils of the Toomes, Guenoc, and Pentz series. Soils of the Supan series are predominant in the western portion of the secondary study area along the northwestern town limits. A complete list of soil series which comprise the primary and secondary study areas, along with their areal extent and physical characteristics, is included in Table 3-4. Soils of the primary and secondary study areas are mapped in Figure 3-3.

Aiken clay loam has been generally characterized as granular, moderately deep, with slow permeability, good drainage characteristics, and medium suitability for timber production. While the information in Table 3-4 indicates that its erosion potential is moderate to very high, the Butte County *Seismic Safety Element* (1977) states that its erosion potential is low. This series ranges from approximately 5 to 11 feet in depth and contains varying amounts of stones and other rock fragments. The parent material of this soil type is basic volcanic rock with some metamorphic layers encountered at depths of twelve to twenty-five feet. Dispersed throughout all soil horizons of Aiken clay loam are hard, massive boulders of weathered andesite (derived from the original volcanic material). Soils of the Toomes, Guenoc, and Pentz series share certain physical characteristics in that they are well-drained, moderately permeable, with slight to moderate erosion potential. Supan series soils are unique in having been derived from secondary volcanic landslide-mudflow parent materials. However, in their basic physical characteristics and drainage/permeability behavior, they closely resemble other soil types of the Paradise area. Despite the varied soil composition of the primary and secondary study areas, certain physical characteristics are generally shared by all soil series within the region. Soils are generally clay, loam, clay loam, or may be gravelly or sandy clay or loam. They have slow to moderate permeability, are well drained, and have moderate to very high erosion potential.

There has been some alluviation (deposition of sediment) in the various drainage depressions and rill networks atop the main ridge. In these drainage systems pockets of silty clay residual soils have formed a somewhat impervious alluvial layer. This condition, while not extensive, has served in a minor way to decrease channel percolation and to increase the potential for flooding along these drainage courses. Other than these small pockets of shallow alluviation, the Paradise-Magalia area is notable for its lack of soil types derived from recent alluvial deposition.



Expansive Soils

According to the draft *Energy, Natural Resources and Recreation Element of the Butte County General Plan (1989)*, expansive soils exist over a majority of Butte County, as depicted on Map III-3 of the *Butte County Safety Element (1977)*. Expansive soils have a potential for shrinking and swelling with changes in moisture content. According to the draft *Energy, Natural Resources and Recreation Element*, soils with no or low expansion potential are found generally along stream valleys and on steep mountain slopes. Soils of high expansion potential are found in the nearly level areas of the Sacramento Valley around the population centers of Chico, Oroville, Biggs and Gridley.

Soil Erosion

According to the *Butte County Safety Element*, erosion may be expected in Butte County where protective vegetation is removed by construction, fire or cultivation. According to the *1967 Report and General Soil Map of Butte County* prepared by the U.S. Soil Conservation Service, there are five classes of erosion hazard, as shown in Table 3-5. Soils of high erosion potential are shown on Map III-2 of the *Butte County Safety Element*. The information in Table 3-5 may also be compared with Figure 3-1, Slope, to determine general locations of areas which may have high erosion potential.

TABLE 3-4
SOIL SYMBOLS AND SOME GENERAL CHARACTERISTICS
OF SOIL SERIES MAPPED
(Note all 5 pages of table)

Soil Series Symbol	Soil Series Name	Occurrence (Study Area)		Areal Extent (%)	Depth (inches)	Texture Surface/ Subsurface	Parent Material	Relief and Slope (%)	Permeability	General Drainage	Erosion Hazard
		1 ^a	2 ^a								
147	Conejo		X		40-80	Heavy clay loam/clay loam	Mixed alluvium	Nearly level to sloping (0-30)	Moderate slow	Well to moderately well	Slight
200	Unclassified on lower alluvial planes and terraces		X	<1	NA	NA	NA	NA	Moderate	Well	Slight
700	Colluvial land, rock outcrop, rockland (mixed rock)	X	X	1	NA	NA	NA	NA	Impermeable to rapid	Excessive	Slight to high
711	Aiken	X	X		60-140	Loam/clay	Basic volcanic rock	Gently sloping to steep (0-50)	Slow	Well	Moderate to very high
7118	Boomer		X		40-80	Gravelly loam/clay loam	Greenstone	Nearly level to very steep (0-70)	Moderate	Well	Moderate to very high
7118m	Boomer (Schist)		X		40-80	Gravelly loam clay	Chlorite schist	Nearly level to very steep (30-70)	Moderate	Well	Moderate
7124	McCarthy	X	X		20-40	Cobbly sandy loam/cobbly sandy loam	Basic igneous tuff and breccia	Gently sloping to very steep (0-70+)	Moderately rapid	Well	Slight
7151	Challenge		X		40-120	Clay loam/clay	Greenstone	Moderately steep to very steep (0-50)	Slow	Well	Slight

Soil Series Symbol	Soil Series Name	Occurrence (Study Area)		Areal Extent (%)	Depth (inches)	Texture Surface/ Subsurface	Parent Material	Relief and Slope (%)	Permeability	General Drainage	Erosion Hazard
		1 ^a	2 ^a								
7153	Englebright		X		20-40	Clay loam/clay	Basic igneous rock	Strongly sloping to extremely steep (0-70)	Moderate	Well	Medium to very high
7153b	Englebright (basalt)	X			20-40	Clay loam/clay	Basalt	Strongly sloping to extremely steep (0-30)	Moderately slow	Well	
7153k	Englebright (greenstone)	X	X		20-40	Clay loam/clay	Meta-volcanic rock	Strongly sloping to extremely steep (0-70)	Moderate	Well	
7153m	Englebright (schist)		X		20-40	Clay loam/clay	Schistone rock	Strongly sloping to extremely steep (0-70)	Moderate	Well	
717	Cohasset	X	X		40-80	Loam/clay loam	Basic igneous rock	Gently sloping to steep (0-50)	Moderate	Well	Moderate to very high
7187	Cobleigh	X	X		40-60	Gravelly loam/clay	Andesitic rock	Gently sloping to moderately steep (0-50)	Moderately slow	Well	Slight to moderate
724	Ishi Pishi		X	0 ¹	29-64	Gravelly loam/clay	Ultramafic rock	Steep (0-50)	Slow	Well	Moderate
726	Dubakella		X		14-28	Stony loam/very gravelly clay	Serpentine rock	Sloping to steep (0-70+)	Slow	Well	Moderate to very high
728m	Neuns (schist)		X		20-40	Gravelly loam/stony loam	Schistose rock	Steep to very steep (0-70+)	Moderate	Somewhat excessive	Moderate

Soil Series Symbol	Soil Series Name	Occurrence (Study Area)		Areal Extent (%)	Depth (inches)	Texture Surface/ Subsurface	Parent Material	Relief and Slope (%)	Permeability	General Drainage	Erosion Hazard
		1 ^a	2 ^a								
7317	Stover	X	X		20-60	Loam/heavy clay loam	Volcanic tuff- breccia	Gently sloping to steep (50-70)	Moderate	Well	Moderate
7339	Coon		X		19-30	Clay loam/clay loam	Fractured basalt	Nearly level to steep (50- 70)	Slow	Well	Slight
745	Guenoc	X	X		20-40	Stony clay/gravelly cobbly clay	Basic igneous rock	Sloping to very steep (0- 30, 50-70)	Moderately slow	Well	
755	Toomes	X	X		4-20	Gravelly loam/gravelly loam	Basalt	Sloping to very steep (0- 70)	Moderate	Well	Slight
756	Supan	X	X		20-40	Loam/clay	Volcanic braccia	Gently sloping to steep (0-70)	Slow	Well	Moderate
756l	Supan (Landflow)	X			20-40	Loam/clay	Landflow of basic volcanic rock	Gently sloping to steep (0- 70+)	Moderately slow	Well	Moderate
7598k	Racerberry (greenstone)		X	< 1	20-40	NA	Greenstone	Rolling (30- 50)	Slow	Moderately Well	High
771	Henneke		X		10-20	Gravelly loam/very gravelly clay loam	Serpentine	Moderately sloping to extremely steep (0-70)	Moderately slow	Well	Moderate

Soil Series Symbol	Soil Series Name	Occurrence (Study Area)		Areal Extent (%)	Depth (inches)	Texture Surface/ Subsurface	Parent Material	Relief and Slope (%)	Permeability	General Drainage	Erosion Hazard
773	Iron Mountain		X		5-20	Gravelly sandy loam/--	Volcanic breccia	Steep (30-50,70+)	Moderately rapid	Well	Moderate
779	Stonyford	X			12-28	Gravelly clay loam/gravelly clay loam	Greenstone	Hilly to very steep (0-70+)	Moderately slow	Somewhat excessive	Moderate
811	Marpa		X		22-40	Very gravelly heavy loam/very gravelly clay loam	Meta-sedimentary rock	Steep to very steep (0-70+)	Moderate	Well	Moderate
8156g	Casabonne (conglomerate)		X		40-60	Gravelly loam/clay loam	Conglomerate	Sloping to very steep (30-70)	Moderately slow	Well	High
816	Sites		X	< 1	60-80	Loam/clay	Metabasic & metasedimentary rock	Gently Sloping to steep (30-70)	Slow	Well	Moderate
827	Mariposa		X		12-35	Gravelly silt loam/gravelly heavy silt loam	Meta-sedimentary rock	Hilly to very steep (0-70)	Moderate	Well	Moderate to very high
921vg	Hely (variant conglomerate)		X		20-48	Gravelly sandy loam/gravelly heavy loam	Weakly consolidated conglomerate	Steep to very steep (50-70)	Rapid	Well	Very high

Soil Series Symbol	Soil Series Name	Occurrence (Study Area)		Areal Extent (%)	Depth (inches)	Texture Surface/ Subsurface	Parent Material	Relief and Slope (%)	Permeability	General Drainage	Erosion Hazard
		1 ^a	2 ^a								
945	Pentz	X	X		< 20	Sandy loam/sandy loam	Andesitic tuff	Rolling to hilly (0-70)	Moderate	Well	Moderate
946	Peters		X		6-24	Clay	Andesitic tuff	Nearly level to steep (0-50)	Slow	Well	Slight
951	Inks	X	X		10-20	Gravelly loam/very gravelly clay loam	Strongly commented tuff	Gently sloping to steep (0-50)	Moderate	Well	Moderate

27

Source: California Dept. of Forestry and Fire Protection, Soil-Vegetation Survey, 1979, 1980.

¹ These soil series are also represented in areas which the CDF classified as mixed composition. Areas classified as mixed composition (i.e. 7124/728m) represent areas where specific mapping was unavailable and contours represent mixed areas whose principal soil series is denoted by the first soil series number and whose secondary soil series is denoted by the second number. These areas (with their associated areal extent) include: 711/7153b, (2%), 7124/728m (<1%), 7124/755 (<1%), 7124/756 (<1%), 7153/724 (<1%), 717/7124 (<1%), 717/728m (<1%), 7317/755 (<1%), 7317/951 (<1%), 7339/755 (<1%), 745/755 (<1%), 755/7124 (<1%), 755/7317 (3%), 755/745 (1%), 755/951 (<1%), 756/755 (<1%), 756/951 (<1%), 945/755 (1%).

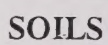


TABLE 3-5**SOIL EROSION HAZARD CLASSIFICATIONS**

CLASS	DESCRIPTION
None	Slopes less than two percent, with subsoil permeability ranging from moderately rapid to rapid
Slight	Slopes of two to nine percent with permeability ranging from moderately rapid with weak soil profile development
Moderate	Slopes of nine to thirty percent with soils of no profile development to weak profile development, and slopes of nine to fifteen percent with moderate profile development
High	Slopes of thirty to fifty percent in soils with no profile development to weak profile development, and slopes of fifteen to thirty percent on soils with moderate to strong profile development
Very High	Slopes in excess of fifty percent on soils with no profile development, and slopes over thirty percent with moderate to strong soil profile development

Source: U.S. Soil Conservation Service, Report and General Soil Map of Butte County (1967), from Butte County draft Energy, Natural Resources, and Recreation Element, (1989).



4.0 CLIMATE AND AIR QUALITY

4.1 CLIMATE

The climate of Paradise may be characterized as an inland Mediterranean climatic type. This climate has warm to hot summers and mild to cool winters with a distinctive winter precipitation regime. The long, dry summer period is somewhat unique to the Mediterranean climate yet is a feature shared commonly with most of California. The winter period is characterized by the passage of mid-latitude storms moving westward from the North Pacific Ocean and bringing moist, unstable air masses into interior Northern California. The actual number of storm centers of low pressure is quite different from year to year and is the primary determinant of precipitation variability from one year to another.

Since these storm systems are basically passing along the North American Polar Front under the influence of a strong westerly wind movement, their passage during winter is a time of considerable air mass interaction. Cold, dry air may flow southward across Northeastern California both during and immediately after the passage of the storm centers. Additionally, a strong southerly flow brings moist, unstable maritime air into the Paradise region from the Pacific Ocean by way of the San Francisco Bay and the Sacramento River Valley. This unstable air brings periods of overcast conditions accompanied by drizzly weather and cooler temperatures which can last for several days. North-south fluctuations in the mid-latitude and subtropical jet streams have been noted to have some effect upon the trajectories of these storm systems as they pass across Northern California.

Precipitation from these storms increases from west to east, with lower totals in the Sacramento Valley and Western Sierran foothills, to much higher totals at higher elevations on the western side of the summit. Reflective of this pattern, most stations such as Chico and Oroville receive between twenty-five/thirty inches of precipitation annually; stations such as Paradise, Forest Ranch, and Grass Valley receive between forty-five/fifty inches; and upland stations such as DeSabra, Brush Creek, and Strawberry Valley receive between sixty/seventy inches per year. Table 4-1 shows the annual precipitation totals for Paradise at an elevation of 1,750 feet above sea level, and for DeSabra at an elevation of 2,563 feet. The average monthly precipitation varies greatly in Paradise (Table 4-2).

According to the Paradise *Multihazard Disaster Plan*, Paradise can experience a major storm at any time during the rain and snow season. The Town of Paradise has been hard hit by major storms in the past. When snowfall occurs in combination with warmer temperatures, a heavy, wet snow is produced which creates the potential for damage to buildings and other snow related hazards. A major snowstorm in 1990 produced significant damage to both public and private property, as well as citizen casualties and injuries.



In general the winter months are cool, overcast and periodically dominated by moist maritime air masses whose passage across Northern California as storm systems becomes increasingly more unstable. Freezes can occur within Paradise at any time between late October and late April; however, prolonged periods of freezing temperatures are rare. Absolute minimum temperatures of 10.8 F. and 9.0 F. have been recorded during January for Paradise and DeSabra respectively. Snowfall frequently occurs during mid to late winter in Paradise. It usually does not remain on the ground long, often melting within thirty-six hours. The periods of snowfall, snow depth, and low winter temperatures are all climatological features which change rapidly within short distances of Paradise as one moves up or down in elevation.

During the winter months the Cascade-Sierra area is dominated by higher pressure as a consequence of the chilling effect of altitude coupled with a snowpack covering the surface. Cooler air tends to settle into basins and valley bottoms where radiational cooling during the relatively calm, clear winter nights can lead to low temperatures. On other occasions, radiational cooling can lead to the formation of thick fog which tends to blanket the Sierran foothills. The lower winter temperatures are also primarily responsible for the low evaporation rates during November-April, when about twenty-five percent of the annual evaporation of 53.6 inches is spread over half of the year.

The summer months are usually quite dry with less than four percent of the annual precipitation arriving in the five month period of May-September. By mid-summer, the Sacramento Valley is usually occupied by an elongated thermal high pressure ridge due to intense heating of the land surface. The retreat northward of the Polar Front is accompanied by the domination of Northern California by the North Pacific high pressure system. Warm, dry, subsiding air masses then dominate the Paradise region bringing low relative humidities and absolute maximum temperatures such as 115 F. at Oroville, 104 F. at DeSabra, and 110 F. at Paradise. The period of mid-June to late September is coincidentally the peak season of fire hazard in terms of optimal "fire weather" conditions: strong northwesterly winds; low relative humidities; low soil moisture; dry brush, grass and timber; high air temperatures; and suitable ignition conditions and temperature. The summer drought is not alleviated by the sporadic summer convectional thunderstorms which bring sporadic and unreliable amounts of warm season moisture and the danger of lightning-set wildfires to the Paradise region.

The rainfall pattern in Paradise can be characterized as one of seasonal drought. This seasonal drought can be extended to a longer term cyclical drought during periods of lower than average annual precipitation. The long term record shows that wide departures from the mean are uncharacteristic for Paradise. However, a high of ninety-six inches was recorded in 1983 and a low of 18.5 inches was recorded for 1976.

TABLE 4-1
ANNUAL PRECIPITATION TOTALS
FOR PARADISE AND DE SABLA, 1958-1989

YEAR	PARADISE ¹	DE SABLA ²
1958	56.10	80.37
1959	30.73	45.45
1960	51.54	71.66
1961	40.37	52.82
1962	61.14	76.36
1963	48.91	61.99
1964	47.82	69.36
1965	44.63	60.02
1966	45.00	52.22
1967	51.76	66.81
1968	52.59	64.42
1969	76.43	86.26
1970	71.43	90.01
1971	27.61	41.02
1972	41.01	52.29
1973	82.84	106.82
1974	59.11	67.01
1975	50.84	63.31
1976	18.47	22.66
1977	35.09	43.95
1978	63.78	82.53
1979	62.81	75.07
1980	52.54	64.30

YEAR	PARADISE ¹	DE SABLA
1981	71.05	88.39
1982	64.72	78.02
1983	96.14	121.24
1984	39.70	44.56
1985	31.77	37.33
1986	58.98	70.59
1987	58.68	59.94
1988	44.94	46.17
1989	40.12	48.09
AVERAGE ANNUAL PRECIPITATION	52.46	65.34

Source: California Climatological Data, Monthly Summaries, 1958-1989, U. S. Department of Commerce, National Oceanic and Atmospheric Administration.

- ¹ Paradise Station elevation 1,750 feet above mean sea level
- ² DeSabra Station elevation 2,710 feet above mean sea level

TABLE 4-2
CLIMATOLOGICAL DATA SUMMARY
PARADISE, CALIFORNIA

MONTH	AVERAGE TEMPERATURE (FAHRENHEIT)	AVERAGE PRECIPITATION (INCHES)	AVERAGE EVAPORATION (INCHES)
January	43.7	9.3	0.7
February	46.6	15.7	0.8
March	49.7	13.3	3.4
April	52.8	4.8	4.4
May	63.2	0.3	7.0
June	71.9	0.2	8.1
July	75.0	0.3	10.2
August	76.4	0.0	9.1
September	74.9	0.0	5.4
October	65.3	2.7	3.4
November	51.0	2.5	1.1
December	44.0	7.2	0.0
ANNUAL AVERAGE	59.5	56.3	53.6

Source: California Climatological Data, U. S. Department of Commerce, National Oceanic and Atmospheric Administration. As cited in Montgomery, "Water Quality Management Plan for Paradise and Magalia," March 1979.



4.2 AIR QUALITY

Paradise lies within the Sacramento Valley Air Basin, which extends from Sacramento and Solano Counties on the south to Shasta County on the north (Figure 4-1). The air basin is generally situated in the northern portion of the Central Valley and is bounded on the west by the Coastal Range, on the north and east by the Cascade-Sierra Nevada and Siskiyou foothills and mountains, and on the south by the San Joaquin Valley Air Basin.

The primary factors affecting air quality in a given area are the quality, type and location of pollutant emissions, the topographic and geographic features of the region, and the prevailing meteorological conditions. An emission rate represents the amount of pollutant released into the atmosphere by a given source over a specified time period. It is generally expressed in units, such as pounds per hour (lb/hr) or tons per year (ton/yr). Local and regional meteorological conditions govern the transport and diffusion of emissions in the atmosphere. Wind speed, wind direction, atmospheric stability, temperature, and the presence or absence of inversions are some of the key factors which affect pollutant dispersion.

The northern Sacramento Valley Air Basin is a natural closed basin, often with poor air circulation and high atmospheric stability. The area is subject to frequent temperature inversions (a layer of cold air capped with a warm air mass), preventing dispersion of pollutants.

The nearest air quality monitoring stations in Butte County are in Chico [carbon monoxide (CO), nitrogen oxides (NO_x), nitrogen dioxide (NO₂), ozone and particulate matter smaller than ten microns in diameter (PM₁₀)]. The Butte County Air Pollution Control District designates the Paradise area as a nonattainment area for ozone and as an attainment area for NO₂, sulfur oxides, lead and sulfates. All other categories are unclassified at this time. The Paradise area has few major stationary sources of air pollutants.

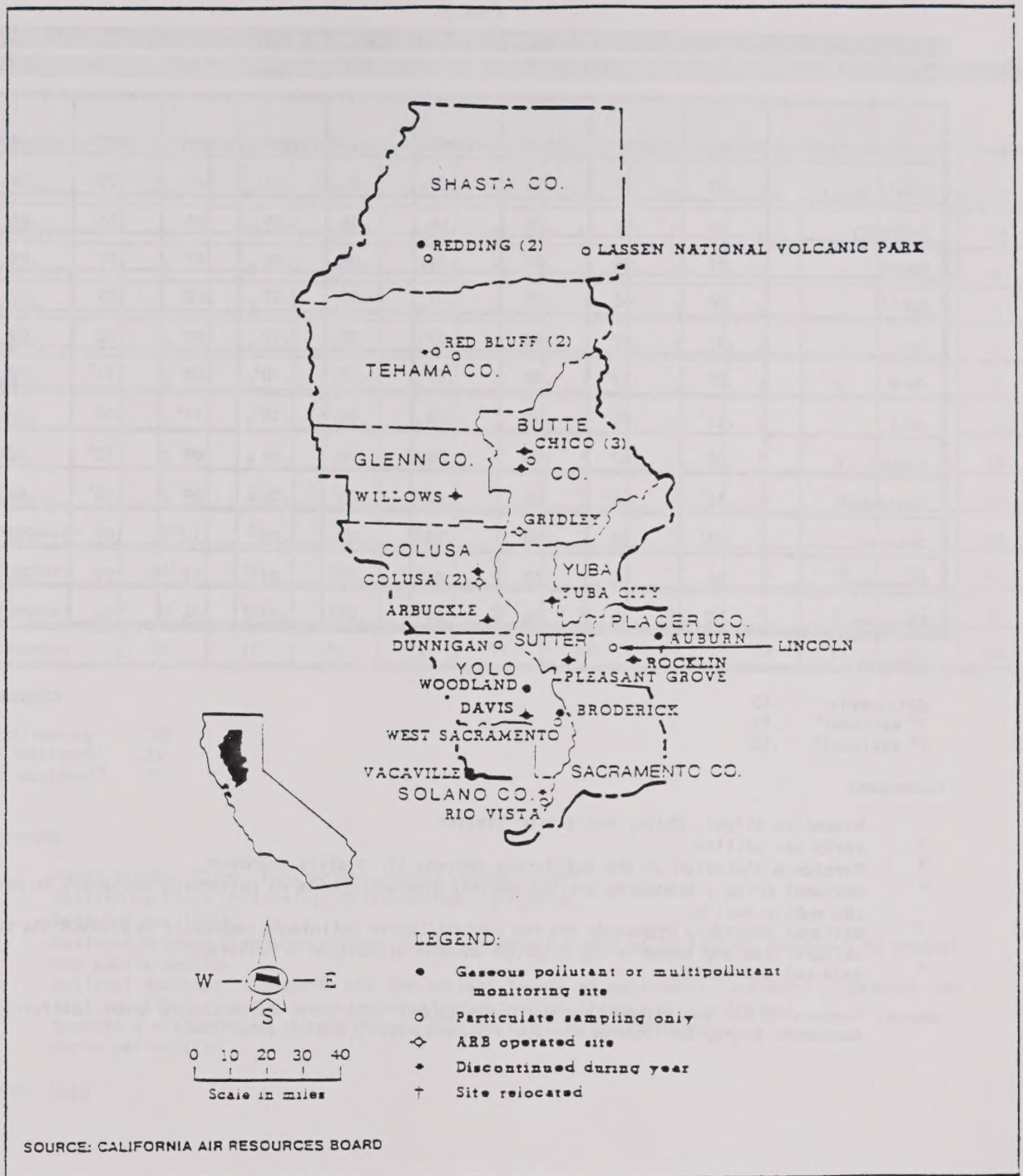
Relative to other nonattainment areas of California, emissions inventories for Butte County show low to moderate emissions of total organic gases and nitrogen dioxide. The burning of agricultural wastes and application of pesticides and herbicides on the valley floor result in hydrocarbon emissions. Agricultural activity is also a significant source of suspended particulates. Vehicular traffic emissions are the major source of CO and the primary constituent of ozone. Motor vehicles comprise the major emission source category generated within the community.

A summary of data from the BCAPCD monitoring stations from 1980 through 1989 pertaining to local pollutant monitoring and the relationship of measured pollutants in the local environment to California and the national ambient air quality standards is contained in Tables 4-3 through 4-6. However, this data should not necessarily be interpreted as having direct applicability to the Paradise area, as Paradise is above the valley floor in the foothills.

The California Clean Air Act (AB 2595, 1988) requires that each air pollution control district that is nonattainment for state ambient air quality standards for ozone or carbon monoxide prepare and submit an



attainment plan. Each plan must include a wide range of control measures which, for most areas, include transportation control measures (programs or measures with the objective of reducing vehicle trip generation and vehicle miles traveled), designed to reduce overall emissions by a net five percent per year from 1987 levels. Butte County is coordinating with other northern Sacramento Valley counties in this planning effort. Refer to Section 16.4 for a more complete discussion of this plan.



SACRAMENTO VALLEY AIR BASIN

FIGURE 4-1

TABLE 4-3
MAXIMUM HOURLY CONCENTRATIONS FOR OZONE ¹
(ppm²)

MONTH	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
January	.03	.04	.06	.05	.05	.04	NA ⁶	.05	.06	.07	.04
February	.04	.04	.05	.04	.06	.05	.06	.06	.06	.07	.06
March	.07	.05	.04	.04	.06	.05	.07	.07	.08	.05	.08
April	.06	.08	.09	.07	.05	.07	.08	.09	.07	.10 ³	.08
May	.07	.07	.08	.07	.09	.07	.09	.08	.09	.07	.08
June	.09	.10 ³	.08	.07	.07	.10 ³	.08	.11 ³	.09	.08	.08
July	.10 ³	.09	.08	.08	.08	.10 ³	.11 ³	.09	.10 ³	.10 ³	NA
August	.09	.07	.09	.08	.08	.09	.09	.10 ³	.10 ³	.09	NA
September	.10 ³	.08	.08	.07	.08	.08	.09	.10 ³	.09	.09	NA
October	.11 ³	.08	.08	.08	.07	.09	.10 ³	.09	.10 ³	.10 ³	NA
November	.06	.04	.03	.04	.05	.07	.07	.05	.06	.06	NA
December	.07	.05	.06	.04	.05	.05	.04	.04	.06	.06	NA

STANDARDS

California .10
 1° National⁴ .12
 2° National⁵ .12

Footnotes:

- ¹ Manzanita Street, Chico, Monitoring Station
- ² Parts per million
- ³ Denotes a violation of the California Ambient Air Quality Standard
- ⁴ National Primary Standards are the ambient Standard levels of pollutants necessary to protect the public health.
- ⁵ National Secondary Standards are the ambient levels pollutants necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
- ⁶ Data not available

Source: Summary of Air Quality Monitoring, Butte County 1980-1989, Butte County APCD; California Air Resources Board, California Air Quality Data, April 1989 - June 1990.

TABLE 4-4
MAXIMUM HOURLY CONCENTRATIONS FOR
CARBON MONOXIDE¹
(ppm⁷)

MONTH	1980 ²	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
January	16	12	12	10	15	15	11	11	12	12	10
February	9	8	9	11	10	15	12	12	6	6	9
March	6	7	4	NA	5	5	7	6	6	6	6
April	5	4	5	5	5	6	5	6	6	5	4
May	3	5	6	4	5	5	4	4	4	5	5
June	3	4	4	3	3	4	NA	3	3	4	3
July	3	4	4	5	4	5	NA	5	5	4	NA
August	4	6	7	5	7	5	NA	8	8	5	NA
September	7	7	8	9	8	5	12	9	9	7	NA
October	NA ³	10	10	11	10	9	12	15	15	12	NA
November	NA	15	11	8	12	15	11	9	9	15	NA
December	NA	17	10	14	15	20 ⁶	9	17	17	12	NA

STANDARDS

California 20
1° National⁴ 35
2° National⁵ 35

Footnotes:

- ¹ Salem Street, Chico, Monitoring station (except 1980)
- ² California State University, Chico Monitoring Station
- ³ Data not available
- ⁴ National Primary Standards are the ambient Standard levels of pollutants necessary to protect the public health.
- ⁵ National Secondary Standards are the ambient levels of pollutants necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
- ⁶ Denotes a violation of the California Ambient Air Quality Standard
- ⁷ Parts per million

Source: Ibid

TABLE 4-5
TWENTY-FOUR HOUR MAXIMUM CONCENTRATIONS FOR
PM-10¹
(ug/m³)²

MONTH	1985	1986	1987	1988	1989 ⁶	1990 ⁶
January	NA ⁷	71 ³	88 ³	69 ³	82 ³	68 ³
February	NA	23	43	73 ³	46	49
March	NA	32	54 ³	28	19	33
April	NA	26	56 ³	25	36	46
May	NA	28	47	26	25	40
June	NA	48	49	46	54 ³	28
July	NA	34	48	40	35	NA
August	NA	47	69 ³	46	35	NA
September	NA	68 ³	74 ³	58 ³	53 ³	NA
October	35	79 ³	60 ³	58 ³	53 ³	NA
November	77 ³	80 ³	68 ³	37	81 ³	NA
December	76 ³	68 ³	29	100 ³	90 ³	NA

STANDARDS

California 50
1° National⁴ 150
2° National⁵ 150

Footnotes:

- ¹ California State University, Chico, monitoring station except November 1989-June 1990.
- ² Micrograms per cubic meter
- ³ Denotes a violation of the California Ambient Air Quality Standard.
- ⁴ National Primary Standards are the ambient Standard levels of pollutants necessary to protect the public health.
- ⁵ National Secondary Standards are the ambient levels of pollutants necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
- ⁶ Chico - Salem Street monitoring station, November 1989 - June 1990.
- ⁷ Data not available.

Source: Ibid

TABLE 4-6
MAXIMUM HOURLY CONCENTRATIONS FOR
NITROGEN DIOXIDE¹
 (ppm²)

MONTH	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
January	NA ⁶	.06	.06	.04	.06	.06	.05	.23	.05	.06	.05
February	.06	.05	.06	.04	.06	.06	.05	.07	.06	.06	.05
March	.05	.05	.05	.04	.07	.04	.05	.06	.05	.05	.05
April	.05	.05	.05	.05	.04	.05	.05	.04	.05	.04	.05
May	.06	NA	.07	.04	.05	.05	.06	.05	.05	.04	.05
June	.05	NA	.05	.05	.08	.04	.05	.05	.04	.04	.04
July	.05	.05	.05	.06	.05	.04	.05	.05	.06	.05	NA
August	.05	.04	.06	.05	.05	.05	.08	.07	.06	.06	NA
September	.07	.05	.08	.11	.07	.04	.05	.08	.07	.08	NA
October	NA	.06	.06	.07	.05	.08	.07	.09	.10	.07	NA
November	.07	.06	.04	.05	.05	.07	.08	.06	.05	.07	NA
December	.10	.05	NA	.04	.16	.07	.08	.07	.06	.07	NA

STANDARDS

California .25
 1^o National⁴ NA
 2^o National⁵ NA

Footnotes:

- ¹ Manzanita Street, Chico, Monitoring Station
- ² Parts per million
- ³ Denotes a violation of the California Ambient Air Quality Standard.
- ⁴ National Primary Standards are the ambient Standard levels of pollutants necessary to protect the public health.
- ⁵ National Secondary Standards are the ambient levels of pollutants necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
- ⁶ Data not available.

Source: Ibid



5.0 HYDROLOGICAL CONDITIONS

5.1 SURFACE HYDROLOGY

The drainage patterns of the Paradise area reflect the uniqueness of its location on a gently sloping ridge surface. The Paradise area is dominated by a somewhat continuous overland runoff flow which is organized into local rills or depressions as the runoff is collected. There is localized erosion and siltation in these depressions or swales due to slope and the topography. However, the bulk of the runoff is shunted downslope to become runoff in lower stream systems.

The Paradise area is divided into fairly distinct drainage basins. These basins are mapped in the *Master Storm Drainage Study and Facilities Plan, Paradise, California* (McCain Associates, 1980). The drainage basins serve to collect the upslope surface runoff and direct it downslope. However, in these local drainage swales the flow is intermittent and only lasts briefly following rainfall. Due to the lack of a continuous flow, the characteristics of a system of active stream erosion have not developed atop the ridge surface.

The drainage basins' bottom configuration depth of incisement is very shallow, usually less than one meter. Thus, these drainage swales lack adequate capacity to convey runoff waters from lengthy storm activity during the winter months. Since the drainage basins are long and narrow, averaging one-fourth to one-half mile wide and four to five miles long, localized flooding may occur at various points. Downslope, these drainage systems have become incised into the basement volcanic rocks and have developed steeper sides and more clearly defined channels. Many of these channels carry a perennial runoff flow.

The drainage systems often coincide with groundwater seeps and springs which serve to increase the moisture availability beyond the intermittent flows directly related to storm runoff. Consequently, the drainage depressions and their downslope channels are often thickly vegetated.

As these areas are developed, the undergrowth and grass cover is often removed and channels are randomly excavated to suit the individual owner's or developer's interest. Often when this takes place, either through lack of knowledge, lack of funds or indifference, the resulting channel is inadequate in capacity and poses a real possibility of promoting damage. While the soils and subsoils of the Paradise area do not markedly aggravate the runoff situation, they also do not prove to be highly permeable. This often results in localized flooding which can be exacerbated by such land use activities as grading operations, vegetation clearance, inattention to storm runoff from construction sites during the peak winter rainfall period, large-scale paving and the lack of a collection system for storm waters. Storm runoff arrives at the principal drainage channels through overland flow for most of the Paradise area. Very few collector systems have been constructed and the primary form of collection has been through roadside ditches.

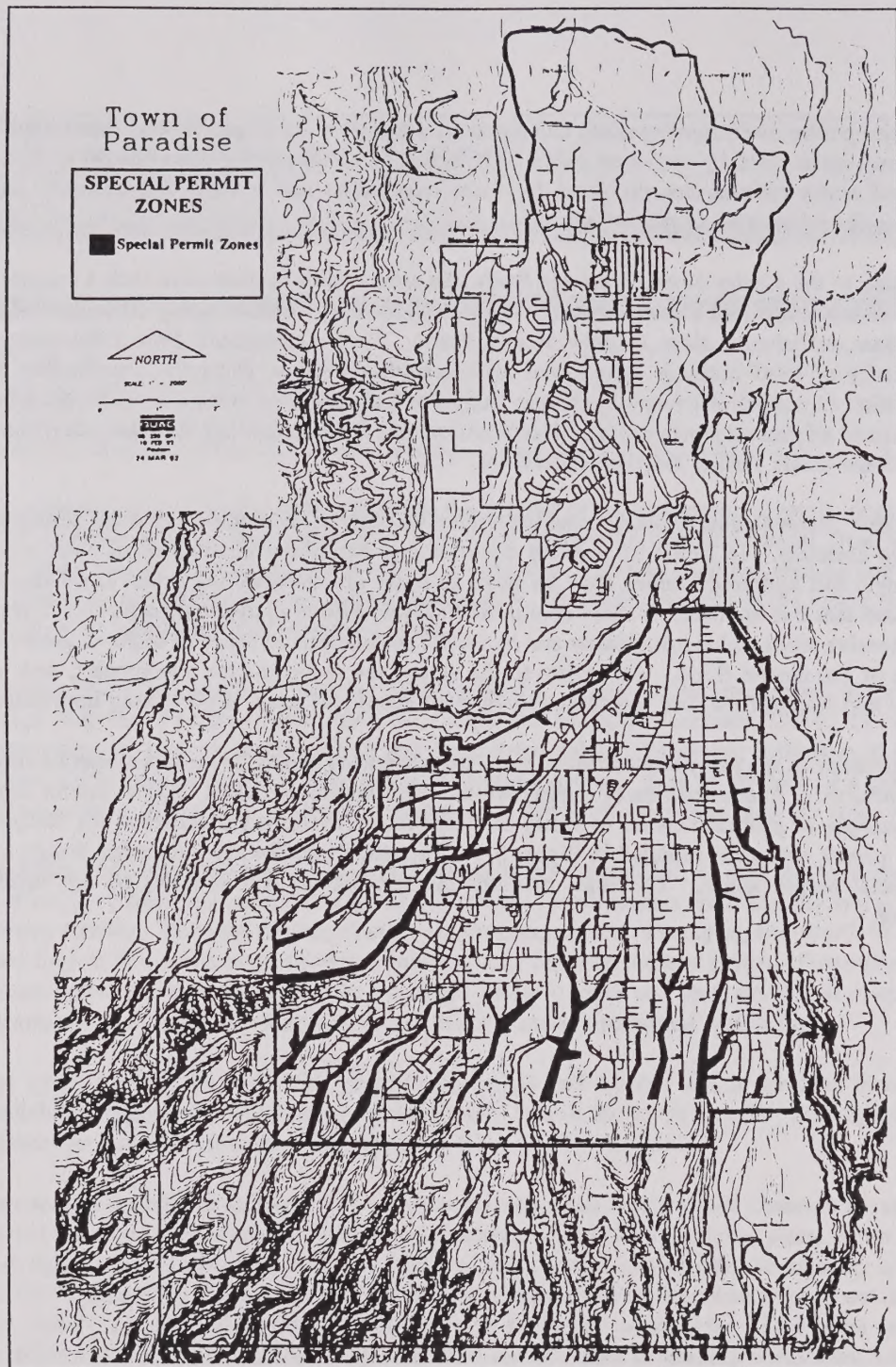


The major public roads running north and south are situated along ridges between basins and carry runoff south until intercepted by east-west roads. The roadside ditches along these roadways tend to get quite deep and create maintenance problems for town road crews and a somewhat unsightly and dangerous condition for motorists and pedestrians.

According to the *Master Storm Drainage Study*, the area studied is situated in such a manner that it is not subject to flooding from outside sources. Unlike many towns on the valley floor, no large streams or rivers pass sufficiently close to provide any threat. Primary overland flow from storm runoff, the inefficiency of local drainage depressions and roadside ditches to carry the intermediate flow and the aggravation of runoff efficiency by human activities has created a somewhat difficult situation for the management of present storm runoff. This situation also has implications for future development projects which could create further flooding difficulties.

The *Master Storm Drainage Study* considered the possibility of recommending flood zoning of the natural drainage channels. In order to properly describe and locate the boundaries of such a zone, detailed hydrologic and hydraulic studies must be made in order to determine the actual flood stage. The study concluded that this approach is more applicable to towns adjoining major streams and rivers. It requires that extensive topographic information and hydraulic calculations be made in order to determine the actual bounds of the design flood. According to the study, the nature of the topography, and lack of major streams and stream flow data, preclude this level of detail and make flood zoning impractical.

As an alternative, the study recommended the establishment of general areas where special clearance should be required prior to construction of improvements. This approach, called "special permit zones," requires the developer or property owner to verify that adequate provisions are provided for design flows. The special permit zones are depicted in Figure 5-1. The study includes recommended design criteria within the special permit zones. The study cautions that the special permit zones do not indicate limits of flooding.



SPECIAL PERMIT ZONES

FIGURE 5-1



5.2 WATER QUALITY

It has been reported (*Town of Paradise Wastewater Management Study, Supplementary Phase 1 Report, 1984*) that there has been contamination of small streams in or emanating from the Paradise area associated with surfacing septic tank effluent.

The layered geology beneath Paradise has led to the formation of several aquifer zones. Depending on local conditions of permeability, weathering and fracturing, the aquifers may have some hydraulic continuity. Beneath Paradise, groundwater movement is generally in a north-to-south direction, although some flow does occur toward Butte Creek and West Branch Feather River Canyons. It is estimated that there are approximately 300 privately owned wells in Paradise which supply water for irrigation and domestic uses. Most wells penetrate into the Tuscan Formation and generally are less than 200 feet in depth.

The most shallow groundwater body consists of perched water lying atop the Tuscan Formation. Influenced by seasonal precipitation and local recharge from onsite wastewater disposal systems, this perched, unconfined groundwater does not produce dependable yields of usable quantity. The underlying Tuscan Formation, however, does have weathered and permeable zones which yield significant quantities of groundwater. Based on a review of well logs for the Paradise area, the Tuscan Formation typically yields usable water at depths of less than 200 feet. Much of the water is under pressure indicating at least partial confinement of some of the water-bearing zones. The upper portions of the Tuscan Formation may hold unconfined water which receives recharge from the Paradise area and could be subject to contamination by septic systems.

Beneath the Tuscan Formation lie the auriferous channel aquifers, which contain large quantities of high-quality water. Since the auriferous, or gold-bearing, channels occur at substantial depths and underlie only limited portions of Paradise, they remain relatively untapped. Due to their depth and apparent confinement, the auriferous channels do not appear to receive significant recharge from surface water or septic systems in Paradise.

The Metamorphic Basement Complex is well consolidated with few weathered or fractured zones and thus is not expected to yield large quantities of water. Only the deepest wells in Paradise appear to penetrate this formation. Like the auriferous channels, the basement complex lies well beneath septic systems and should not be subject to contamination from on-site wastewater disposal.

Septic tank/leach line failures in Paradise do not affect water supplies distributed by the Paradise Irrigation District since its sources are outside the urban area. Local shallow wells which were dug long ago and which may still have limited use may be affected.



Factors that may affect the domestic water quality and supply for the Town of Paradise:

- a. Surface water protection from siltation, contamination and other pollutants.
- b. Logging operations within the Little Butte Creek watershed.
- c. Development within the Little Butte Creek watershed.
- d. Unauthorized land use activities within the Magalia/Paradise watershed protection zone.
- e. Legal issues related to appropriation of water and associated water rights.
- f. Regulations concerning treatment requirements of surface water.
- g. Long-term precipitation averages (e.g. drought conditions).
- h. Storage capacity of Paradise Lake and Magalia Reservoir.
- i. Potable water treatment, storage and distribution system capacities and conditions.
- j. Water reclamation and reuse regulations and practices.
- k. Seepage and loss of water supply from reservoirs and delivery system network.
- l. Funding sources for required system maintenance, upgrades and necessary facilities expansion to meet existing or future demand.



PARADISE/MAGALIA RESERVOIR WATERSHED

FIGURE 5-2



5.3 TOWN AND DISTRICT RESPONSIBILITIES

The Town of Paradise exercises, through the Town Engineer and the Community Development Department, regulatory responsibility for the provision of adequate drainage facilities for new developments. The town also provides maintenance for drainage facilities within public rights-of-way.

North of and adjacent to the town, County Service Area No. 4 provides periodic maintenance of drainage facilities in county rights-of-way for the community of Paradise Pines. The county requires drainage improvements as a condition of development.

The recommendations of the above-referenced *Master Storm Drainage Study and Facilities Plan* (1980) with respect to detention basins, channel improvements, and culvert upgrading are implemented to the extent that funding and regulatory authority with respect to new development permits.



6.0 VEGETATION AND WILDLIFE

Vegetation

Several natural vegetation communities occur within the Paradise study area, including chaparral, non-native grassland, riparian woodland, Great Valley cottonwood riparian forest, foothill woodland, digger pine - oak woodland, Ponderosa pine forest, and northern hardpan vernal pool, all of which are described below.

- **Chaparral.** The chaparral or sclerophyllous woodland is an association of tall, evergreen, woody shrubs which dominates many sites within the Paradise region that are open and dry or in various stages of a post-burn succession. Although characterized as a brushland, chaparral formations are often interspersed with grasses and scattered trees and thus integrate with the other vegetation communities. The chaparral community is often composed of locally dominant species of shrubs along with an admixture of many other species. The dominant shrubs of typical communities are toyon (*Heteromeles arbutifolia*), several manzanitas (*Arctostaphylos*), California lilac (*Ceanothus* spp.), bitter cherry (*Prunus emarginata*), scrub oak (*Quercus dumosa*), redbud (*Cercis occidentalis*), yerba santa (*Eriodictyon californicum*) and mountain mahogany (*Cercocarpus betuloides*). Chaparral formations occur most prominently on the slopes adjacent to the canyons of Butte Creek and the West Branch of the Feather River, the ridge surfaces and valley sides in south Paradise and in areas which have been cleared, heavily logged or recently burned.
- **Non-native Grassland.** The non-native grassland consists of a dense to sparse cover of annual grasses with flowering culms, often associated with numerous species of showy-flowered, native annual wildflowers, especially in years of favorable rainfall. With few exceptions, the plants are dead through the summer-fall dry season, persisting as seeds. This vegetation type occurs in the valleys and foothills of most of California, on fine-textured, usually clay soils, moist or even waterlogged during the winter rainy season and very dry during the summer and fall.
- **Riparian Woodland.** The riparian woodland occurs as narrow strips of dense brush and trees along the water courses of south Paradise and around the localized drainage basins to the north. The dominant riparian trees are willow (*Salix* sp.), white alder (*Alnus rhombifolia*), western sycamore (*Platanus racemosa*), Fremont cottonwood (*Populus fremontii*), California laurel (*Umbellularia californica*), big-leaf maple (*Acer macrophyllum*), and western dogwood (*Cornus nuttallii*). Prominent as understory and vinelike plants are poison oak (*Toxicodendron diversilobum*), California wild grape (*Vitis californica*), wild blackberry (*Rubus* spp.) and elderberry (*Sambucus mexicana*). This association has been greatly disrupted by development along the various watercourses which drain southwesterly across the ridge surfaces of Paradise.
- **Great Valley Cottonwood Riparian Forest.** The Great Valley cottonwood riparian forest is a dense, broadleaved, winter deciduous riparian forest dominated by Fremont cottonwood (*Populus*



fremontii) and Goodding's willow (*Salix gooddingii variabilis*). Understories are dense, with abundant vegetative reproduction of canopy dominants. Scattered seedlings and saplings of shade-tolerant species such as California box elder (*Acer negundo californica*) or Oregon ash (*Fraxinus latifolia*) may be found, but frequent flooding prevents their reaching into the canopy. These sites are inundated yearly during spring, resulting in annual inputs of nutrients, soil, and new germination sites. This vegetation community was formerly extensive along the major low-gradient (depositional) streams throughout the Central Valley, but is now reduced to scattered, isolated remnants or young stands because of flood control, water diversion, agricultural development, and urban expansion. Approximately 1200 acres of this sensitive vegetation community occurs within the Dry Creek floodplain.

- **Foothill Woodland.** The foothill woodland extends across the extreme southern portions of the town and dominates the ridge surfaces to elevations of 1,300 feet. The primary floral elements of this woodland are blue oak (*Quercus douglasii*), interior live oak (*Quercus wislizenii*) and digger pine (*Pinus sabiniana*). Above 1,500 feet these species give way to canyon live oak (*Quercus chrysolepis*), tan-bark oak (*Lithocarpus densiflora*) and black oak (*Quercus kelloggii*). Several species of shrubs provide an understory to this open woodland. Prominent in this community are manzanita (*Arctostaphylos* sp.), California lilac (*Ceanothus* sp.), yerba santa (*Eriodictyon californicum*), poison oak (*Toxicodendron diversilobum*) and several members of the rose family (e.g. the genera *Prunus*, *Rubus* and *Rosa*).
- **Digger Pine-Oak Woodland.** This woodland is a mixture of digger pine (*Pinus sabiniana*) and blue oak (*Quercus douglasii*). Pure stands of either tree do occur, but mixed stands are more common. *Pinus sabiniana* usually towers over the oaks in undisturbed stands. Understories usually are dominated by introduced annuals. This vegetation type occurs on well-drained sites with Mediterranean climate, in rocky or exposed sites along ridges or canyons with poor or shallow soils.
- **Westside Ponderosa Pine Forest.** The Ponderosa pine forest occurs as a broad transitional zone between the foothill woodland and higher mixed coniferous associations and is most extensive above 1,500 feet elevation in Paradise. It is generally a closed forest dominated by Ponderosa pine (*Pinus ponderosa*). The closely related Jeffrey pine (*Pinus jeffreyi*) occurs locally on drier sites and serves as a specific indicator of ultrabasic and serpentine rock outcroppings. The Ponderosa pine zone has been the most heavily logged of all the communities in northern California and this practice has allowed the encroachment of other woody species into areas formerly covered by pines. The Ponderosa and Jeffrey pines are found locally intermixed with incense-cedar (*Calocedrus decurrens*), Douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), black oak and several additional hardwood species including big leaf maple, western dogwood and California laurel. The ponderosa pine forest zone represents the primary habitat type utilized for development in the Paradise area.
- **Northern Hardpan Vernal Pool.** Located within close proximity of the tertiary study area is a documented vernal pool community classified by the California Natural Diversity Data Base (CNDDB) as northern hardpan vernal pool. These pools are ephemeral wetlands that occur when winter and spring rains fill the depressions in hogwallow or mima mound areas. Several sensitive plant species occur in association with the northern hardpan vernal pool community: Hoover's spurge (*Chamaesyce hooverii*, federal-Category 1; state-none), Green's tuctoria (*Tuctoria greenei*,



federal-candidate Category 1; state-rare), and Shippee meadowfoam (*Limnanthes floccosa* ssp. *californica*, federal-Category 1; state-endangered).

Federal Category 2 candidate species for federal listing comprise taxa for which information now in possession of the U.S. Fish and Wildlife Service indicates proposing to list the species as endangered or threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat(s) are not currently available to support proposed rules at this time. Federal Category 1 candidate species comprise taxa for which the service has sufficient biological information to support a proposal to list as endangered or threatened.

Other sensitive species with reported occurrences within or near the study area include California hibiscus (*Hibiscus californicus*, federal-Category 2; state-none), which occurs in moist, freshwater-soaked river banks and low peat islands in sloughs, marshes and swamps; Butte County checkerbloom (*Sidalcea robusta*, federal-Category 2; state-none), which occurs in small draws and rocky crevices in chaparral and cismontane woodland communities; California beaked-rush (*Rhynchospora californica*, federal-Category 2; state-none), occurring in freshwater seeps.

Sensitive plant species with the potential to occur within or near the study area include Ahart's paronychia (*Paronychia ahartii*, federal-Category 2; state-none), which occurs in stony, nearly barren clay of swales and higher ground around vernal pools in valley and foothill grassland communities; and veiny monardella (*Monardella douglasii* var. *venosa*, federal-Category 2; state-none), which also occurs in valley and foothill grasslands; adobe lily (*fritillaria pluriflora*); Butte County fritillary (*Fritillaria eastwoodiae*); Red Bluff dwarf rush (*Juncus leiostermus* var. *leiostermus*); Bidwell's knotweed (*Polygonum bidwelliae*); Butte morning glory (*Calystegia atriplicifolia*); clustered lady slipper orchid (*Cypripedium fasciculatum*); Butte County (Shippee) meadowfoam (*Limnanthes floccosa* sp. *californica*, State-Endangered); and Greene's Orcutt Grass (*Tuctoria greenei*, State-Rare). Appendix B contains a partial listing of common and sensitive plant species found within and in the vicinity of the study area.

Timber

The draft Butte County *Energy, Natural Resources, and Recreation Element* defines timberlands as land available for timber production and capable of growing at least twenty cubic feet of industrial-quality wood per acre per year. Timberlands in Butte County occur at elevations between approximately 2,200 and 6,200 feet. According to the above-referenced document, timberlands in Butte County occupy approximately 341,000 acres, including most of the northern and eastern portions of Butte County. Approximately twenty-seven percent of timberlands in Butte County are on national forest land. Portions of the northerly secondary study area are within the boundaries of the Lassen National Forest.

Butte County recognizes the value of its timber resources by affording protection through the use of Timberland Preserve Zoning (TPZ). The California Forest Taxation Reform Act created timberland preserve zoning as a measure to reduce property taxes and protect timberlands from encroachment. TPZ-zoned lands within the Paradise secondary study area are shown on the *Land Use/Circulation Diagram* in Volume I, *Policy Document*. The timberland preserve zoning ordinance of Butte County also designates other timberland zoning districts in Butte County, including parcels within the secondary study area.



The California Forest Practice Act regulates timber harvesting on nonfederal lands. The act delegates authority for timber harvest plan review and enforcement of forest practice rules to the California Department of Forestry and Fire Protection (CDF). Forest practice rules include guidelines for timber harvest plans. A timber harvest plan is required for harvesting of timber for commercial purposes on parcels larger than three acres.

The Paradise Irrigation District owns timberlands in the secondary study area and has harvested timber on these lands. Local opposition has been expressed to the continuation of this practice due to concerns with soil erosion, sedimentation and deterioration of the watershed, clear-cutting and construction of access roads. As described in the draft *Energy, Natural Resources, and Recreation Element*, timber harvest operations in and adjacent to riparian zones can affect aquatic ecosystems through removal of vegetation and deposition of sediment and debris in stream channels. Another local concern with timber harvesting north of Paradise in general is the impact of the passage of logging trucks through the town.

Wildlife

Wildlife reported for the Town of Paradise and the study areas is typical of the transitional foothill habitat types found on the western flank of the Sierra plateau. Appendix B contains a partial listing of common and sensitive wildlife species which occupy the habitats within Paradise and adjacent Butte County. This list is not meant to represent a comprehensive survey of the resident and migratory wildlife. The urbanized portions of Paradise are inhabited by a wide diversity of wildlife. No threatened, endangered or candidate wildlife species have been documented within the Paradise study area.

- **Sensitive Wildlife Species.** Currently there are twenty-four species of sensitive wildlife found in the general region (Appendix B). None of these species has been recorded by the natural diversity data base within the study area. These species include the western yellow billed cuckoo (*Coccyzus americanus occidentalis*), California red-legged frog (*Rana aurora draytoni*), foothill yellow-legged frog (*Rana boylei*), American badger (*Taxidea taxus*), golden eagle (*Aquila chrysaetos*), northern harrier (*Circus cyaneus*), black-shouldered kite (*Elanus caeruleus*), prairie falcon (*Falco mexicanus*), burrowing owl (*Athene cunicularia*), Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), winter-run chinook salmon (*Oncorhynchus tshawytscha*), giant garter snake (*Thamnophis couchi gigas*), Aleutian Canada goose (*Branta canadensis leucopareia*), bald eagle (*Haliaeetus leucocephalus*), Swainson's hawk (*Buteo swainsoni*), American peregrine falcon (*Falco peregrinus anatum*), California black rail (*Laterallus jamaicensis*), greater sandhill crane (*Grus Canadensis tabida*), great gray owl (*Strix nebulosa*), willow flycatcher (*Empidonax traillii*), bank swallow (*Riparia riparia*), least Bell's vireo (*Vireo bellii pusillus*), Sierra Nevada red fox (*Vulpes vulpes necator*), and wolverine (*Gulo gulo*).
- **Deer Population.** Deer herds throughout most of California exhibited a serious long-term decline during the late 1960s and early 1970s. The California Department of Fish and Game (CDFG) then initiated a herd planning program designed to address this problem. In 1976 a statewide *Plan for California Deer* was approved. In 1977, legislative mandate AB 1521 added emphasis to the program. Subsequently, a new deer management policy was adopted by the California Department of Fish and Game. This policy specifies: (1) planning for deer herd management on a herd basis,



(2) that specific program elements be included in each herd plan, and (3) that herd plans generally conform to the goals of the statewide plan.

One of the deer populations associated with the Paradise study area, the Camp Beale herd, is part of the Mother Lode Deer Management Unit. There are no unique biological or geographical features which define the herd boundary. Rather, the herd is composed of resident deer populations which have similar habitat types in common (oak woodland and chaparral in the foothills and remnant marsh and riparian vegetation in the valley). The eastern boundary of the Mother Lode Deer Management Unit is an area of overlap with neighboring migratory herds. In the Paradise study area these herds are the Bucks Mountain herd, the Mooretown herd and the Eastern Tehama herd. This area of overlap is variable in size and depends on topography, severity and onset of winter, and forage conditions. During winter, migratory deer may descend to low elevations and winter with resident deer. Similarly, Mother Lode deer may occupy home ranges within neighboring migratory herd winter range.

A management plan was prepared for the Bucks Mountain/Mooretown deer herds in 1983. This study identified the generalized herd boundaries (Figures 6-1 and 6-2) and identified transportation corridors in areas designated for "agricultural-residential" use in the Butte County General Plan. Corridors within or partially within the Paradise study area include Pentz Road, Clark Road, Neal Road, Skyway (to Inskip), Honey Run Road and Highway 70. The plan sets goals for deer herd management and includes recommendations regarding minimum parcel sizes and densities of development within critical summer and winter ranges, major migration corridors, holding areas, and noncritical summer and winter ranges. A similar management plan was also developed for the Eastern Tehama deer herd in 1983 (Figure 6-3). Figure 6-4 depicts DFG-designated development zones within migratory deer winter ranges, as well as critical and noncritical summer and winter ranges, herd boundaries, and major migration corridors within the Study Area.

- **Fisheries.** The lower reaches of Butte Creek support a varied fish population dominated by suckers (*Catostomus occidentalis*) and squawfish (*Ptychocheilus grandis*). Smallmouth bass (*Micropterus bolomieu*) and catfish (*Ictalurus* spp.) are also found on lower Butte Creek. Appendix B contains a listing of the fish of Butte Creek. The most important fishery is provided by runs of anadromous (sea going) fish including chinook salmon (*Oncorhynchus tshawytscha*) and steelhead trout (*Salmo gairdneri gairdneri*), which make their way up Butte Creek to the reach of stream below Centerville powerhouse.

As late as the 1960s, Butte Creek supported a spring run of chinook salmon of over 4,000 adults (a maximum of 20,000 in 1960), a lesser number of fall run chinook salmon and a small number of steelhead trout. Currently, the spring-run numbers fewer than 200 adults. These numbers represent more than a ninety-five percent decline in the past thirty years. CDFG population estimates and Pacific Gas and Electric (PG&E) fish surveys indicate that few adult spring-run salmon reach upper Butte Creek, where excellent flow, temperature, and habitat conditions are available. The fall-run population varies between a few to as many as 1,000 (1985) and the number of steelhead trout is unknown (Hinton, 1989).

Project dams and diversions in Butte Creek have had an adverse impact on salmon and steelhead. The decline of Butte Creek's once numerous chinook and steelhead fisheries is attributed to inadequate flows, poor water quality and inadequate fish ladders at several diversion dams.

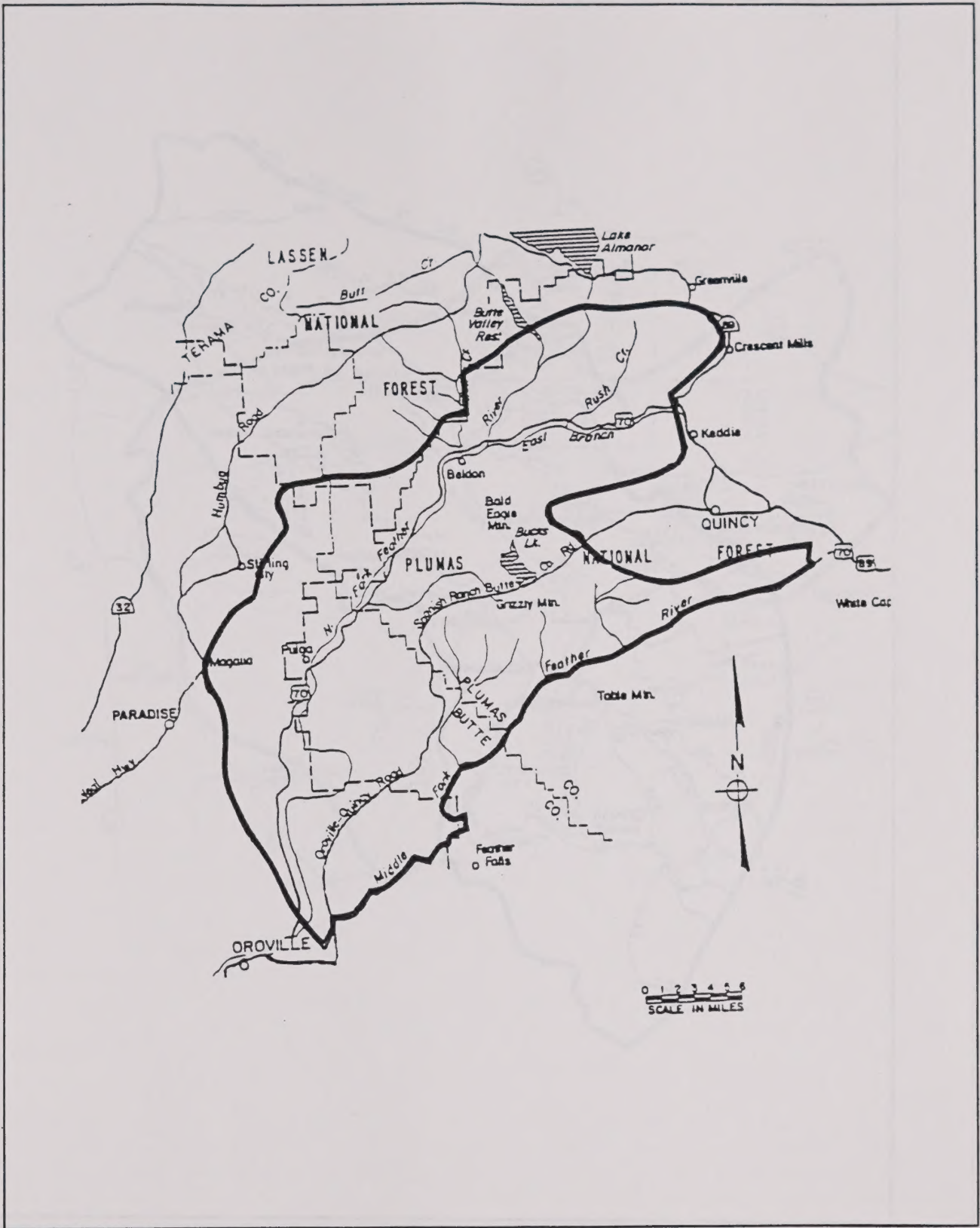


Reduced flows of water in the creek resulting from the various barriers and diversions increase water temperature and decrease oxygen supply. This combination is lethal to both salmon and steelhead.

Anadromous fish are precluded from spawning in the West Branch Feather River due to the barrier imposed by Oroville Dam. The Feather River Hatchery below Oroville Dam supports a run of steelhead and salmon. Lake Oroville supports a healthy warm-water fishery including largemouth, smallmouth, spotted, and redeye bass (*Micropterus* spp.); bluegill, green and redear sunfish, (*Lepomis* spp.); catfish (*Ictalurus* spp.); and DFG-stocked chinook salmon (*Oncorhynchus tshawytscha*) and brown trout (*Salmo trutta*). Development in the canyons of the West Branch Feather River watershed may lead to erosion and pollution which could detrimentally affect the Lake Oroville Fishery, according to DFG (Flint, 1991).

The West Branch Feather River represents the western arm of Lake Oroville reservoir. Releases from Hendricks Dam near Stirling City downstream to a diversion structure northeast of Magalia provide for perennial streamflows. A well-established brown and rainbow trout (*salmo gairdneri*) population depends on these flows which Pacific Gas and Electric Company maintains under contractual agreement with DFG.

The dam structure northeast of Magalia diverts streamflows to the Upper Miocene Canal (which runs parallel to the West Branch Feather River before feeding Kunkle Reservoir south of the town). Dewatering in the stretch of the West Branch Feather River between Magalia and Lake Oroville renders the section unsuitable to support viable game-fish populations.

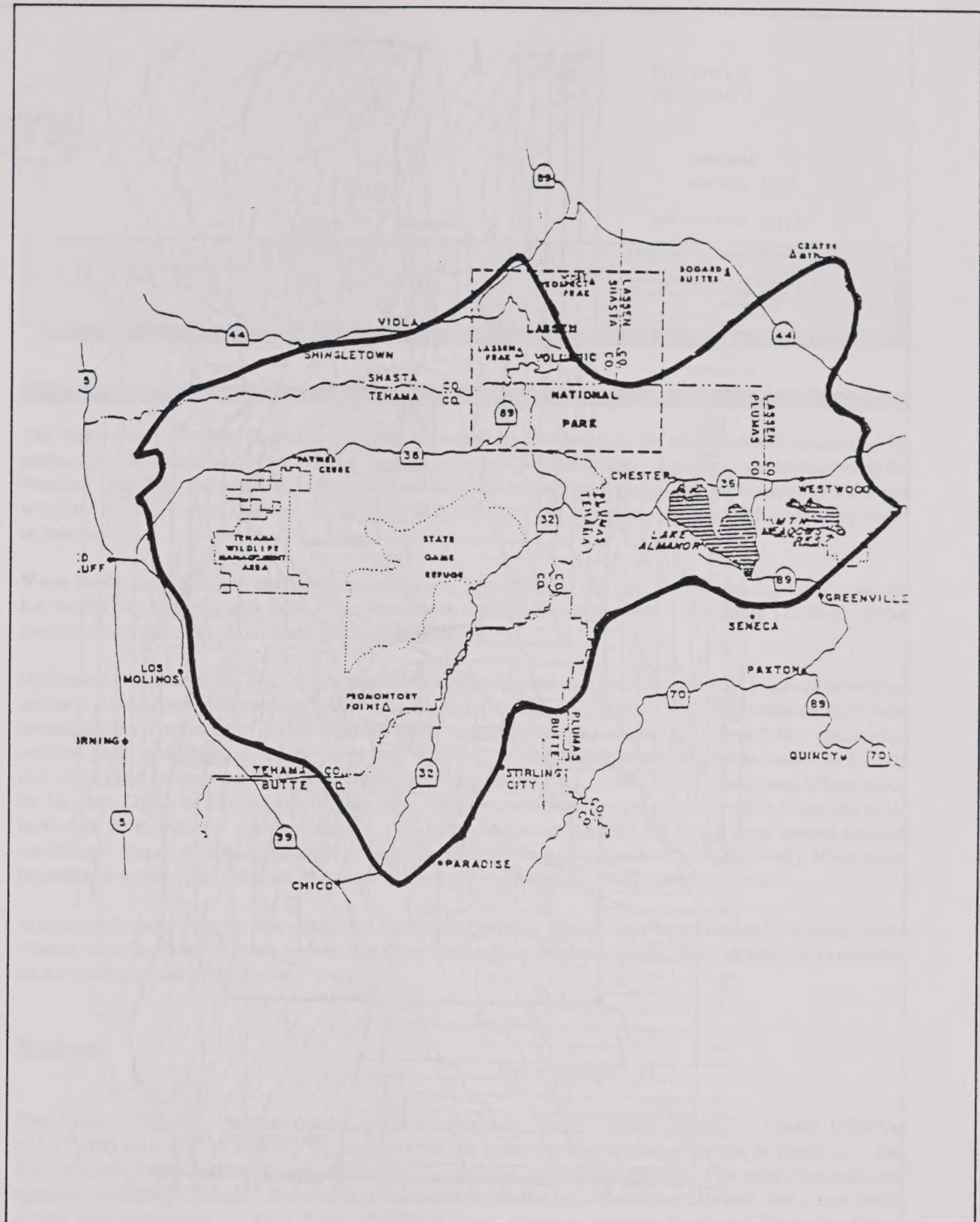


BUCKS MOUNTAIN DEER HERD BOUNDARY (GENERALIZED) FIGURE 6-1



MOORETOWN DEER HERD BOUNDARY (GENERALIZED)

FIGURE 6-2



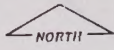
EASTERN TEHAMA DEER HERD BOUNDARY

FIGURE 6-3

Town of Paradise

LEGEND

-  Winter Range
-  Critical Winter Range
-  Major Migration Corridor
-  Designated Development Zones Within Migratory Deer Winter Ranges



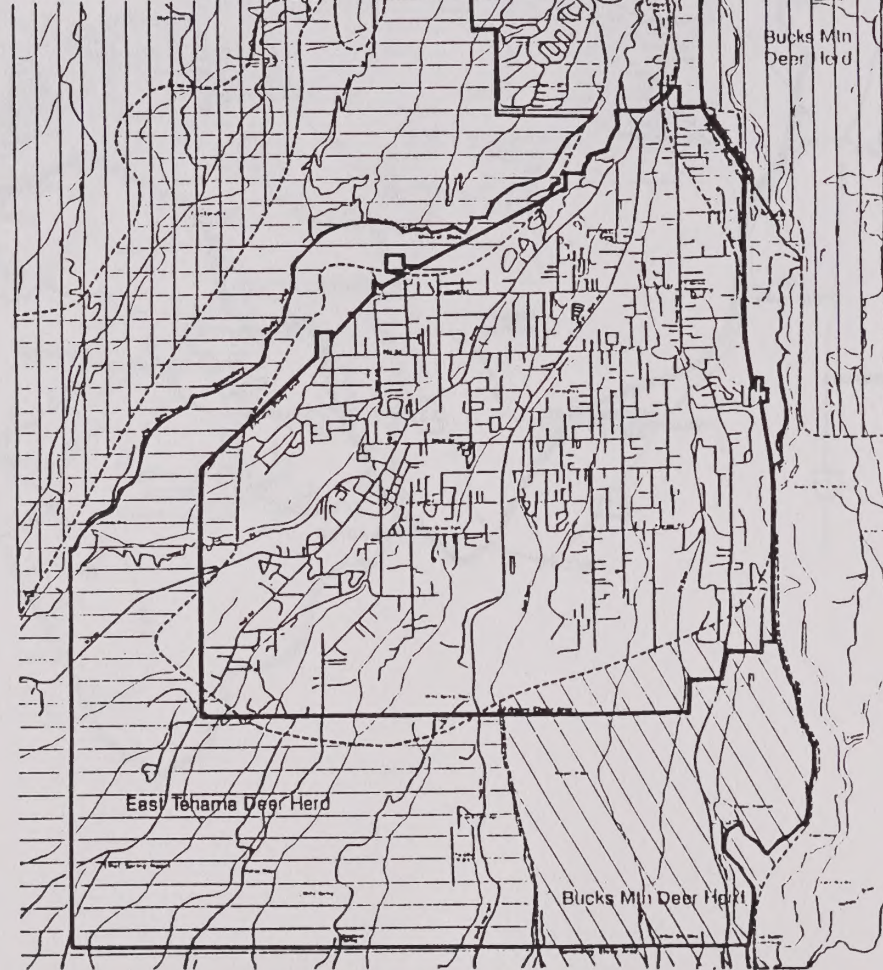
SCALE 1" = 2000'

SUAC

NO. 100 071

10 FEB 97

34 MAR 97



DEER HERD RANGES AND MIGRATION CORRIDORS

FIGURE 6-4



7.0 NOISE

The state *Noise Element Guidelines* require that major noise sources be identified and quantified by preparing generalized noise contours for current and projected conditions. Significant noise sources in the Paradise study area include traffic on major roadways and highways, airports, and representative industrial activities and fixed noise sources. Please refer to Appendix C for a glossary of acoustical terminology used in this section.

Noise modeling techniques and noise measurements were used to develop generalized L_{dn} noise contours for the major roadways and fixed noise sources in the Paradise study area for existing (1990 for major roadways and 1991 for fixed noise sources) conditions.

Noise modeling techniques use source-specific data including average levels of activity, hours of operation, seasonal fluctuations, and average levels of noise from source operations. Modeling methods have been developed for a number of environmental noise sources including roadways, railroad line operations, railroad yard operations, industrial plants and airports. Such methods produce reliable results as long as data inputs and assumptions are valid. The modeling methods used closely follow recommendations made by the state Office of Noise Control, and were supplemented where appropriate by field-measured noise level data to account for local conditions. The noise exposure contours are based upon annual average conditions. Because local topography, vegetation or intervening structures may significantly affect noise exposure at a particular location, the noise contours should not be considered site specific.

A community noise survey was conducted to describe existing noise levels in noise-sensitive areas within Paradise and the Paradise study area so that noise level performance standards can be developed to maintain an acceptable noise environment.

Roadways

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used to develop L_{dn} contours for all highways and major roadways in Paradise. The FHWA model is the analytical method presently favored for traffic noise prediction by most state and local agencies, including Caltrans. Short-term (fifteen-minute) traffic noise measurements and concurrent traffic counts were conducted for State Route 191/Clark Road, Skyway, Pearson Road and Elliott Road (See Figure 7-1) on March 14, 1991. The noise measurements were made to evaluate the noise exposure due to traffic on those roadways. Using traffic data and the FHWA methodology, traffic noise levels as defined by L_{dn} were calculated for existing (1990) traffic volumes. Distances from the centerlines of selected roadways to the L_{dn} contours are summarized in Table 7-1.



These calculations do not include consideration of shielding caused by local buildings or topographical features, so the distances reported in Table 7-1 are worst-case estimates of noise exposure along roadways in the community.

Existing traffic volumes were not provided for some of the local arterials. However, Figure 7-2, prepared using the FHWA model, may be used to estimate the distance to the 60 dB L_{dn} contour for projected volumes of arterial traffic. For arterial traffic, the predicted distance to the 60 dB L_{dn} contour is determined by the average daily traffic volume (ADT) and the posted speed limit. L_{dn} contours derived from Figure 7-2 are only indicators of potential noise conflicts, requiring more detailed analysis to determine traffic noise levels at any given location.

Industrial Noise

The production of noise is a result of many industrial processes, even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by federal and state employee health and safety regulations (OSHA and Cal-OSHA), but exterior noise levels may exceed locally acceptable standards. Commercial, recreational and public service facility activities can also produce noise which affects adjacent sensitive land uses.

The following descriptions of existing fixed noise sources in the Paradise study area are intended to be representative of the relative noise impacts of such uses, and to identify specific noise sources which should be considered in the review of development proposals. The locations of these noise sources are shown by Figure 7-1.

- **Easy Street Industrial Park.** The Easy Street Industrial Park is located on the east side and adjacent to State Route 191 near the south Paradise town limit. Currently the industrial park is approximately thirty percent built out. Existing uses at the industrial park include Fashion Optical Displays, Arlin's RV Repair, Ken's Paradise Hitch and Welding, John H. Franklin Company (paving, excavating, septic systems and general engineering), Frontier Tours, PAL Plastics, CMT Tool Company, Paradise Solid Waste Systems, Inc. and the Paradise Animal Shelter. The industrial park is also used for heavy truck and equipment storage.

Based upon field observations at the Easy Street Industrial Park, the area noise environment is dominated by State Route 191 vehicle noise. Major noise sources associated with the industrial park included heavy truck traffic, machinery, heating ventilation and air conditioning systems, and dogs barking at the animal shelter. During the field observations, none of the noise sources could be isolated from area roadway traffic noise.

The Easy Street Industrial Park has adequate room for expansion in the future. Loud or obtrusive noise sources could be located at the industrial park in the future. Uses which inherently have loud or obtrusive noise sources, and could be located at the industrial park in the future include,



but are not limited to, sand and gravel operations, asphalt and concrete batch plants, machine shops, bottling and canning operations, and heavy equipment maintenance shops.

Airport Noise

The Paradise Skypark Airport is located south of the Town of Paradise town limits in the secondary study area. It is a private, public use general aviation airport. The airport has one runway 1,990 feet in length with a heading of 17/35. Based upon the December 1988 California Department of Transportation Division of Aeronautics *California Aviation System Plan*, the Paradise Skypark Airport has twenty-three single engine piston, one multi-engine piston, and one rotor-craft piston based aircraft with a total of 10,000 annual average aircraft operations. The Butte County Airport Land Use Commission adopted a revised policy plan for the Paradise Skypark in August 1985, and a *Comprehensive Land Use Plan* (CLUP) was adopted in March 1986.

Based upon the Paradise Skypark Airport Land Use Plan, the fifty-five dB L_{dn} noise contour for aircraft operations is confined to the airport property and does not extend into the Paradise town limits (see Figure 7-3). However, existing residential uses located within the southern town limits are located under the northern end of the Paradise Skypark approach zone (see Figure 7-4).

Community Noise Survey

A community noise survey was conducted to document noise exposure in areas of the community containing noise sensitive land uses. For that purpose, noise sensitive land uses in the Paradise study area were considered to include residential areas, parks, schools, day care centers, hospitals and other medical facilities. Noise monitoring sites were selected to be representative of typical conditions in the community.

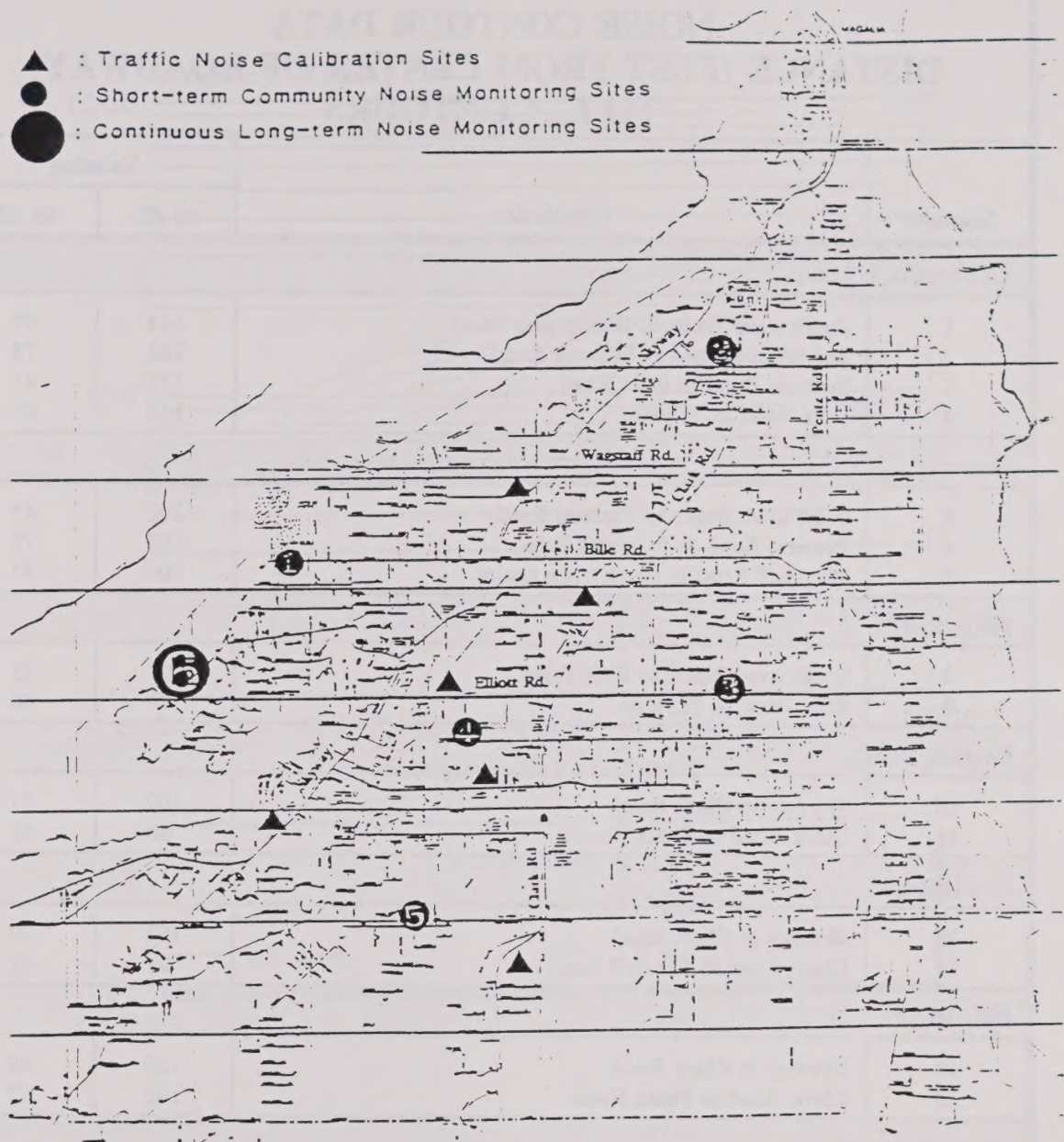
Short-term noise monitoring was conducted on March 13-14, 1991. Each site was monitored three different times during the day and night so that valid estimates of L_{dn} could be prepared. One long-term noise monitoring site was established in Paradise to record day-night statistical trends. The data collected included the L_{eq} and other statistical descriptors. Noise monitoring sites, measured noise levels and estimated L_{dn} values at each site are summarized in Table 7-2. Monitoring sites are shown by Figure 7-1.

The community noise survey results indicate that typical noise levels in noise sensitive areas of the study area are in the range of forty-five dB to fifty-six dB L_{dn} . Noise from traffic on local roadways and neighborhood activities is the controlling factor for background noise levels in the study area. In general, the areas of Paradise and the Study Area which contain noise sensitive uses are quiet.

The continuous monitoring data in Figure 7-5 show that ambient noise levels reach a minimum during the hours of 1:00-5:00 a.m., increasing during the daytime hours as a function of increased traffic and other



human activities. Figures 7-5, 7-6 and 7-7 show the results of the short-term community noise monitoring survey.



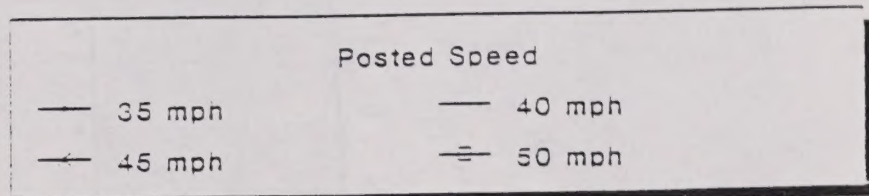
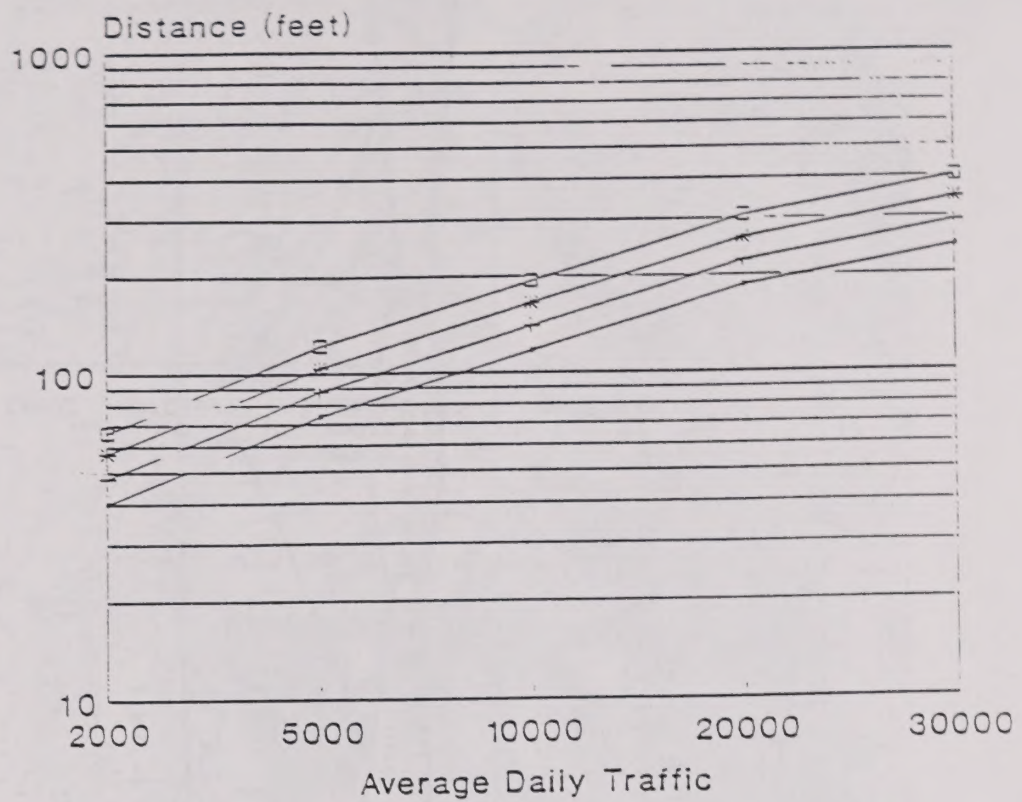
NOISE MONITORING AND CALIBRATION SITES

FIGURE 7-1

**TABLE 7-1
NOISE CONTOUR DATA
DISTANCE (FEET FROM CENTER OF ROADWAY
TO L_{dn} CONTOURS**

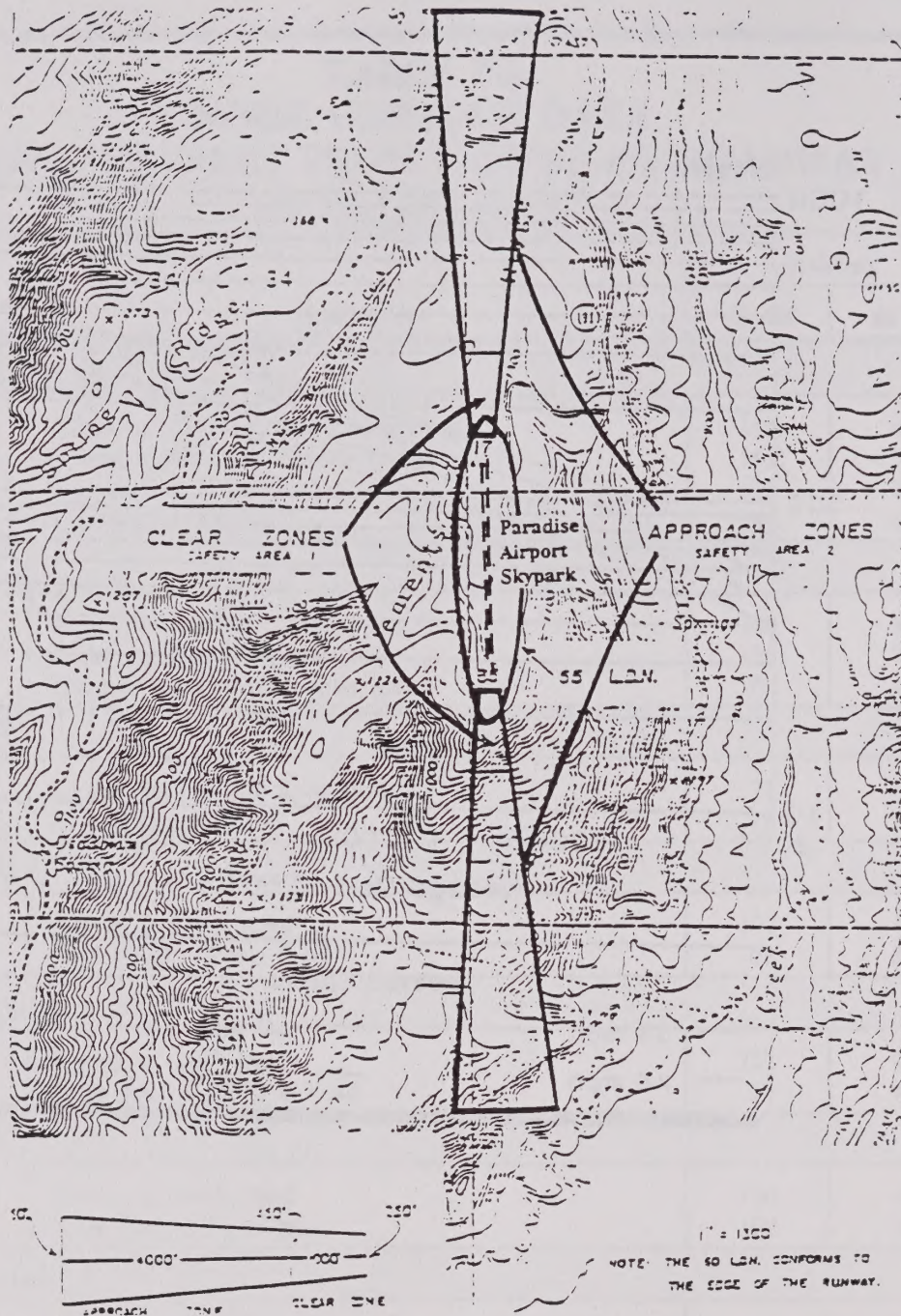
Segment	Description	Existing	
		60 dB	65 dB
SR 191/Clark Road:			
1	South town limits to Buschmann Road	144	67
2	Buschmann Road to Pearson Road	162	75
3	Pearson Road to Bille Road	175	81
4	Bille Road to Skyway	140	65
Skyway:			
5	West town limits to Pearson Road	140	65
6	Pearson Road to Wagstaff Road	156	72
7	Wagstaff Road to north town limits	102	47
Pentz Road:			
8	South town limits to Bille Road	71	33
9	Bille Road to Skyway	78	36
Pearson Road:			
10	Skyway to Clark Road	102	47
11	Clark Road to Pentz Road	68	31
Elliott Road:			
12	Skyway to Clark Road	151	70
13	Clark Road to Sawmill Road	93	43
Bille Road:			
14	Skyway to Clark Road	100	46
15	Clark Road to Pentz Road	102	47
Wagstaff Road:			
16	Skyway to Clark Road	64	30
17	Clark Road to Pentz Road	81	38

Source: Brown-Buntin Associates, Inc.



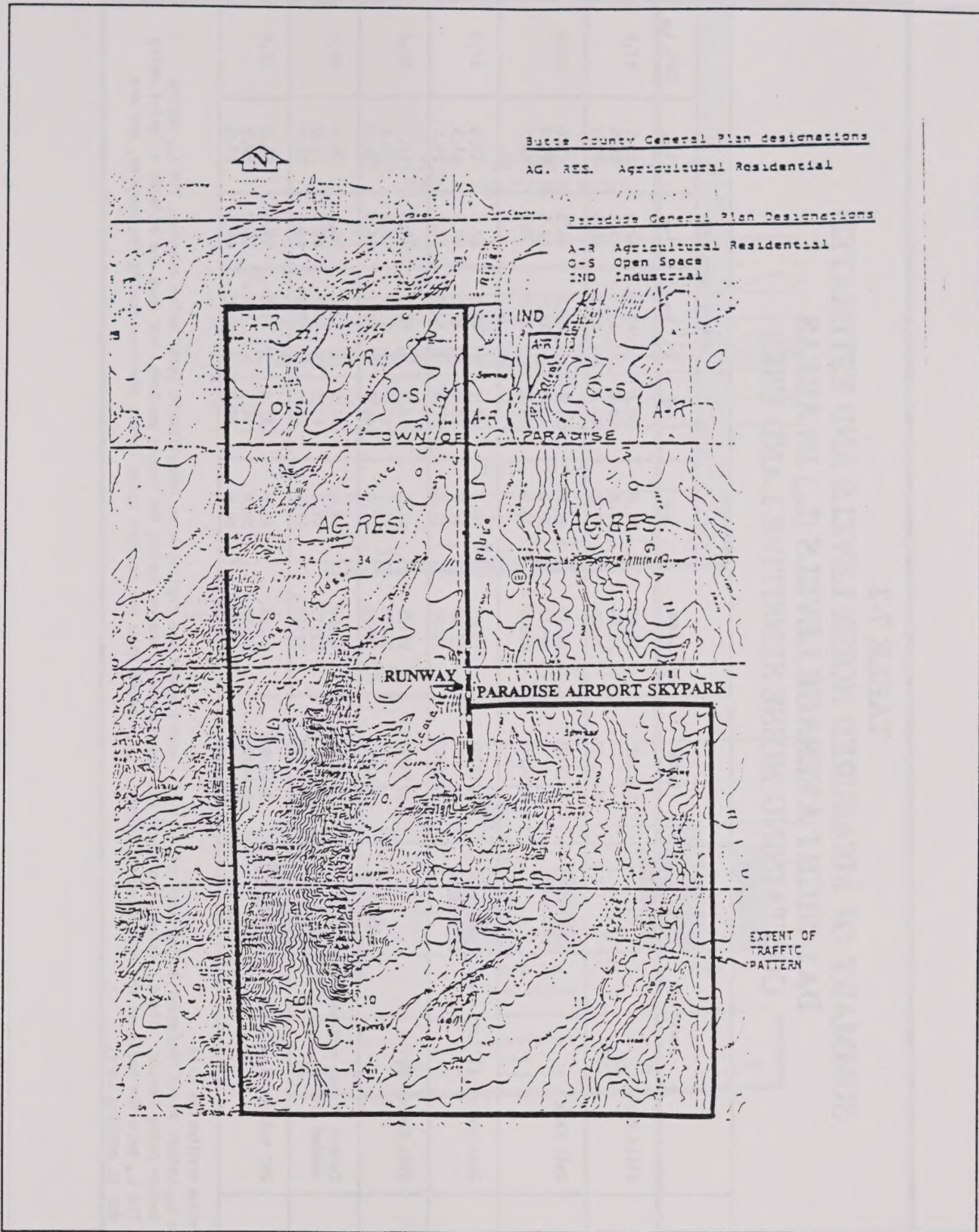
DISTANCE TO 60 dB L_{dn} CONTOUR ARTERIAL TRAFFIC

FIGURE 7-2



PARADISE SKYPARK AIRPORT APPROACH ZONE

FIGURE 7-3



PARADISE SKYPARK AIRPORT

FIGURE 7-4

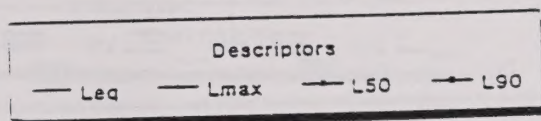
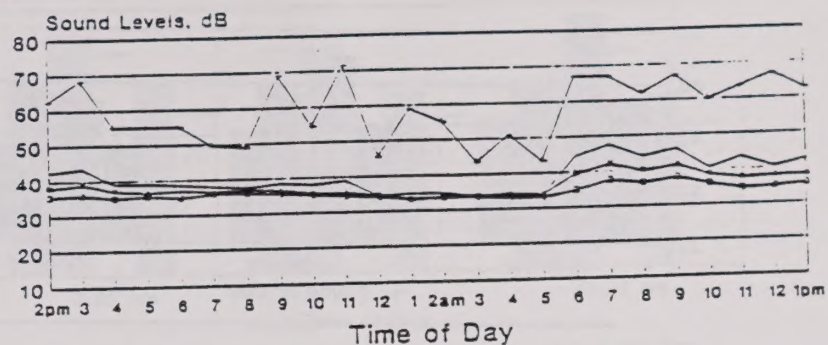
TABLE 7-2
SUMMARY OF MEASURED NOISE LEVELS AND ESTIMATED
DAY-NIGHT AVERAGE LEVELS (L_{dn}) IN AREAS
CONTAINING NOISE SENSITIVE LAND USES

Site	Location	Date	Time	Sound Level, dB					
				L_{90}	L_{50}	L_{10}	L_{eq}	L_{max}	Est. L_{dn}
1	Bille Park	3/13/91	13:45	35.0	39.0	44.0	42.5	60.5	47.4
			22:00	37.0	40.0	43.0	40.5	58.0	
		3/14/91	09:00	40.0	44.0	45.0	44.0	49.0	
2	Ball Park	3/13/91	14:30	42.5	43.5	46.5	46.5	63.0	49.2
			22:15	38.0	41.0	44.5	42.5	55.0	
		3/14/91	09:30	36.5	38.0	39.5	38.5	46.5	
3	East end of Elliott Road	3/13/91	15:00	40.5	41.5	43.5	42.0	47.0	47.0
			22:35	39.0	40.0	41.5	40.5	46.5	
		3/14/91	10:05	35.5	37.5	42.0	40.5	54.5	
4	5921 Camino Drive	3/13/91	15:25	44.5	49.5	53.5	50.5	57.5	49.6
			23:00	43.5	47.5	51.0	48.5	55.5	
		3/14/91	10:30	41.5	46.0	52.5	48.5	56.0	
5	Corner of Roe and Scottwood in a wooded area	3/13/91	16:00	49.0	49.5	52.0	50.5	55.0	55.9
			23:15	41.0	47.5	51.5	49.5	55.0	
		3/14/91	11:05	47.5	48.0	50.0	48.5	54.0	
6	287 Valley View Drive ¹	3/13/91	16:00	35.0	37.0	41.5	39.0	55.0	45.5
		3/14/91	01:00	34.0	34.5	35.5	35.0	59.0	
		3/14/91	11:00	34.5	37.5	44.0	43.5	67.0	

¹ = Continuous monitoring site

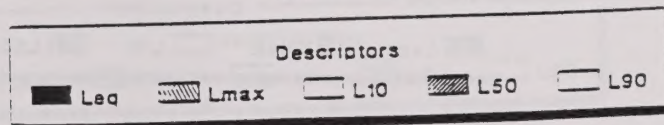
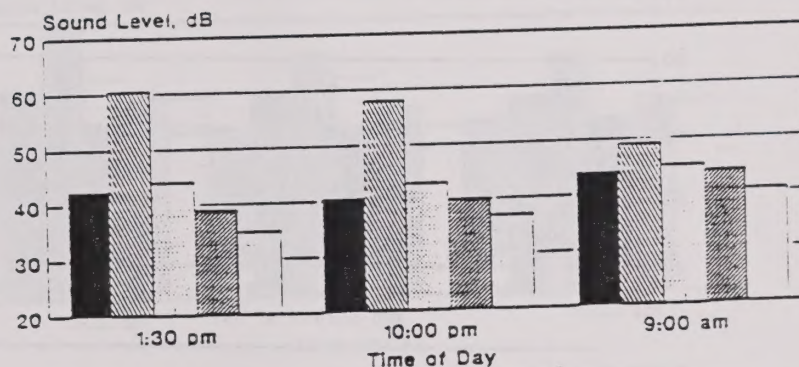
NOTE: The L_{90} values shown represent background noise levels, where there are typically no identifiable local noise sources. The L_{50} values represent median noise levels. The L_{eq} values represent the average noise energy during the sample periods, and show the effects of brief noisy periods. The L_{eq} were the basis of the estimated L_{dn} values. L_{max} values show the maximum noise levels observed during the samples, and are typically due to passing cars.

Hourly Noise Levels 287 Valley View Drive



March 13-14, 1991
Ldn = 45.5 dB

Community Noise Survey Bille Park

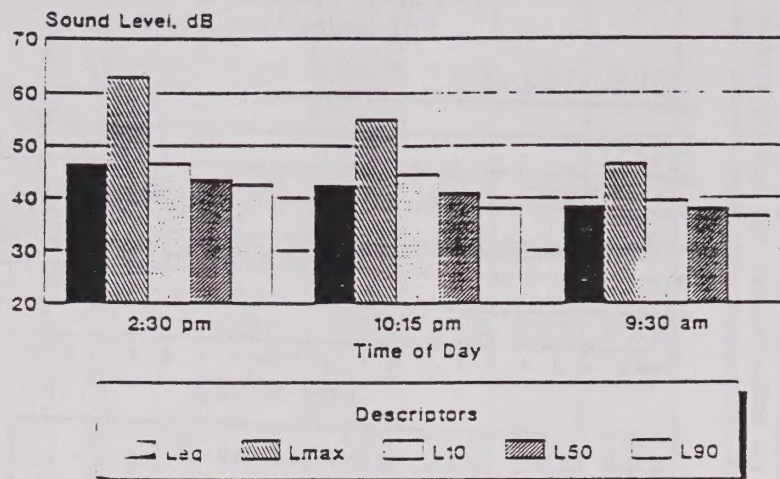


COMMUNITY NOISE SURVEY

FIGURE 7-5

Community Noise Survey

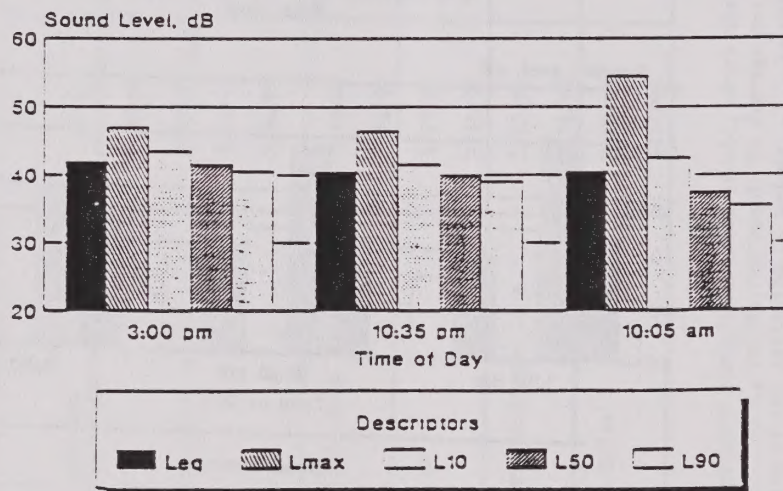
Ball Park



March 13-14, 1991
Ldn = 49.2 dB

Community Noise Survey

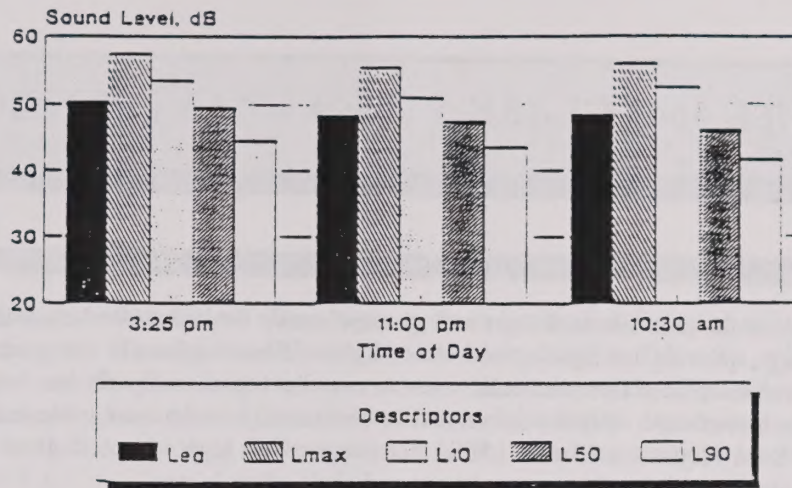
E. End of Elliot Rd.



COMMUNITY NOISE SURVEY

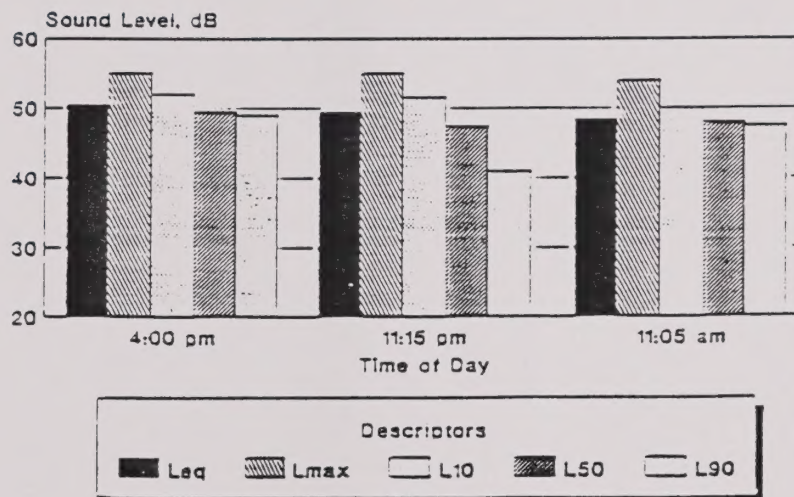
FIGURE 7-6

Community Noise Survey 5921 Camino Drive



March 13-14, 1991
Ldn = 49.6 dB

Community Noise Survey Corner of Roe and Scottwood



COMMUNITY NOISE SURVEY

FIGURE 7-7



8.0 LIGHT AND GLARE

A nighttime survey of the area revealed light and glare primarily limited to modern commercial centers, consisting of signage, parking lot lighting and street lights. Street lights are not generally installed in residential areas, and are placed in commercial areas to ease the transition for drivers between brightly lit parking lots and dark roadways. Within the secondary and tertiary study areas, potential sources of light and glare include State Highways 99 and 191 and Skyway. The high school stadium as well as other lighted athletic fields are additional sources of light and glare when in use.



9.0 EXISTING LAND USE

In February and March, 1991, QUAD Consultants conducted a detailed survey of existing land uses within the primary study area. The results of the survey are summarized in Table 9-1, which sets forth both acreage estimates and the percentage each use comprises of the total. Generalized land use for the secondary study area has been derived from aerial photography and maps from a land use survey conducted by the Butte County Association of Governments in 1989. Land use patterns for both study areas are shown in Figure 9-1.

The results of the land use survey of the primary study area are compared with the 1980 land use acreage estimates included in the 1982 *Paradise General Plan*, as shown in Table 9-2.



THE JOURNAL OF THE ROYAL ANTHROPOLOGICAL INSTITUTE

Volume 100, Part 1, 1970
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Town of Paradise

Figure 9-1
EXISTING LAND USE

- Mobilehome
- Mobilehome Park
- Mobilehome Subdivision
- Single-Family Residential
- Multi-Family Residential
- Commercial
- Industrial
- Vacant
- Agricultural
- Schools
- Parks
- Public/Institutional
- Church
- Professional Office
- Paradise Memorial Trailway
- Paradise Memorial Trailway - Paved
- Hospital
- Southern Pacific Railroad Right-of-way
- Airport

NORTH

SCALE: 1" = 2000'

0 1" 1"

QUAD

90 259 GP1
10 FEB 92
Paulson
24 MAR 92

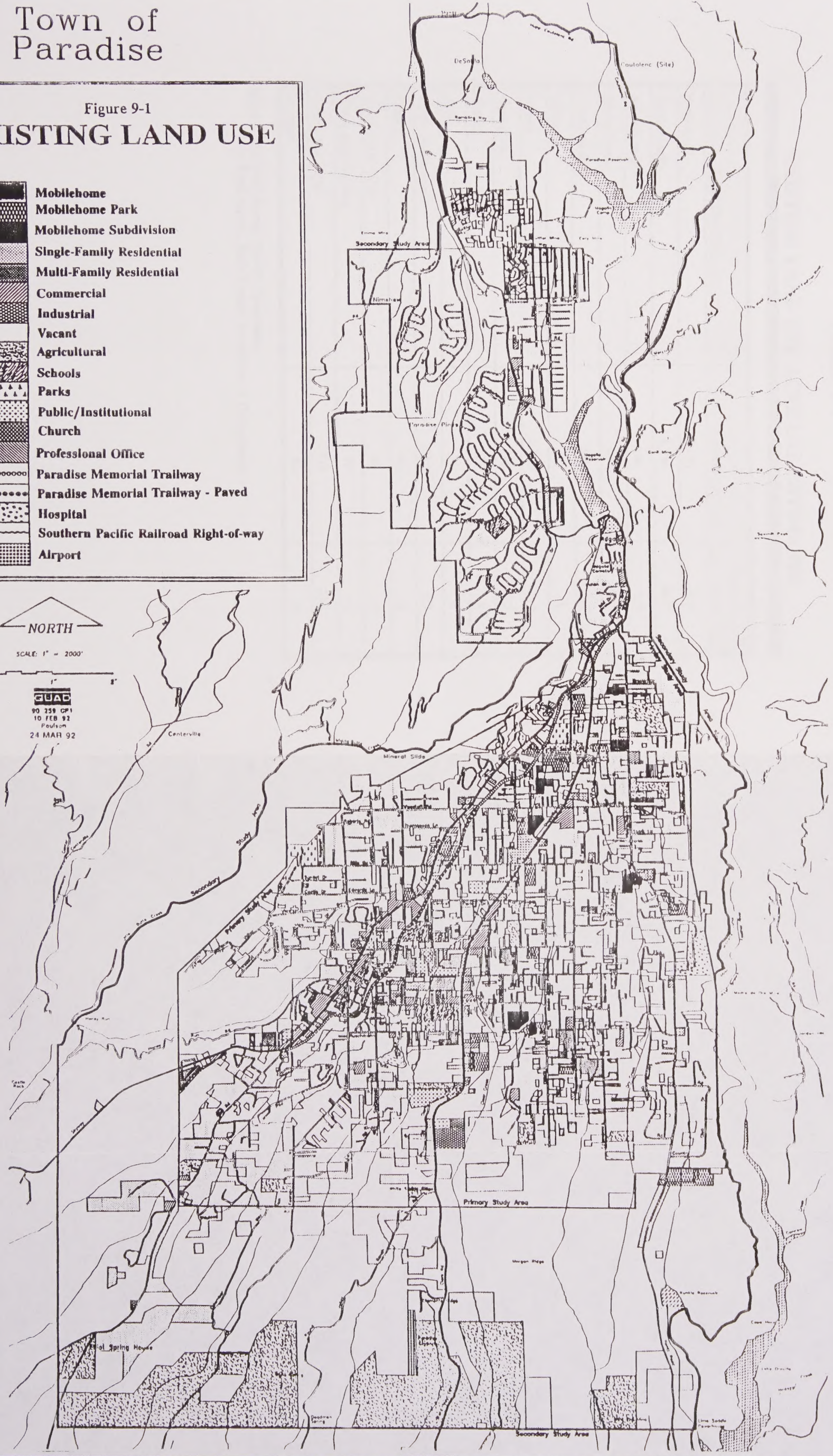


TABLE 9-1

EXISTING LAND USE ACREAGE ESTIMATES

Land Use Category	Acreage	Percent of Total
Residential	5,404	46.4
Single Family	4,739	40.7
Multi-Family	146	1.3
Mobile home	519	4.5
Commercial	251	2.2
Industrial	30	.3
Vacant	2,299	19.8
Agriculture	145	1.2
Schools	26	.2
Parks	73	.6
Public/Institutional	388	3.3
Church	90	.8
Professional Office	67	.6
SPRR Right-of-Way	74	.6
Streets and Lanes	2,735	23.5
Hospital	56	.5

Source: 1991 Field Survey, QUAD Consultants
1989 Field Survey, Butte County Association of Governments

TABLE 9-2**COMPARISON OF LAND USE ACREAGE, 1980-1991****Primary Study Area**

LAND USE CATEGORY	ACREAGE			PERCENT OF TOTAL		
	1980	1991	Acreage Change	1980	1991	% Change
Residential	4,419	5,404	+ 985	38.1	46.4	+ 22.3
Commercial	266	318	+ 52	2.4	2.7	+ 19.5
Industrial	20	30	+ 10	0.2	.3	+ 50.0
Vacant	3,487	2,299	-1,188	30.1	19.8	- 34.1
Agriculture	282	145	- 137	2.4	1.2	- 48.6
Public & Institutional	243	560	+ 317	2.1	4.8	+ 130.5
SPRR Right-of-Way	74	74	0	0.6	.6	0.0
Parks	68	73	+ 5	0.6	.6	+ 7.4
Streets and Lanes	2,720	2,735	+ 15	23.5	23.5	0.0
TOTAL	11,579	11,638	+ 59	100.0	100.0	+ .5
Source: 1991 Field Survey, QUAD Consultants 1982 Paradise General Plan						



10.0 RISK OF UPSET AND SAFETY

Seismic and natural flood hazards relevant to the Paradise study area have been described in the preceding sections on *Geology and Seismicity* (3.2) and *Hydrology* (5.0). Other potential hazards include wildland fire hazards, dam failure, aircraft accidents and a hazardous materials spills and leaks. The terrain and limited access to the community restrict emergency evacuation routes. The town has recently completed preparation of a *Multihazard Disaster Plan* which addresses earthquakes, hazardous material incidents, major storms, major fires and volcanic eruptions.

The wildland fire hazard in the Paradise study area results from topography, elevation, dry summer climate, winds, access, water availability, buildup of combustible materials, vegetation patterns, and structural materials, and is compounded by periods of drought. The peak fire hazard season occurs from late June through early October. Please refer to Section 14.2 for a complete discussion of fire protection. According to the *Multihazard Disaster Plan*, due to the sheer volume of people that can be affected at one time by a wildland fire, a number of potential traffic flow problems exist. These are complicated by the existence of only one north route out of town; only four south routes out of town, two of which could easily be affected by a single fire; and only three through east-west streets. The plan concludes that any fire in the Magalia area would have a major impact on the roads in Paradise because access is via a two-lane road. The plan identifies the following specific areas of concern:

- Lower Neal Road
- The west side, especially Valley View, Valley Ridge, Acorn Ridge and adjoining areas
- Foster Road (single paved access, with Wayland Road to Neal Road as the only other escape)
- Fires threatening large sections of Skyway or Pentz, which could cut off both north and south egress

The potential for hazardous materials incidents exists primarily on the major highways which cross the study area and leaking underground tank storage. Please refer to Section 16.5 for a discussion of the *Butte County Hazardous Waste Management Plan*.

The potential for aircraft accidents exists in relation to Paradise Skypark Airport, a privately-owned, public use airport located south of the town limits, within the secondary study area, on the west side of Clark Road. According to the *Paradise Skypark Airport Land Use Plan* (Butte County Association of Governments, 1985), the airport has experienced no crashes involving the public or scheduled air carriers in recent years. According to this plan, approximately fifty percent of civilian aircraft accidents occur within airport boundaries, and approximately fifteen percent outside airport boundaries and within one mile



of airports. Of these near-airport accidents, approximately sixty percent are concentrated within narrow strips of land at both ends of the runway (approach and departure zones).

The Butte County Mosquito Abatement District has indicated that Lyme disease is present in the Paradise area due to the presence of disease-bearing ticks. The district has also indicated that storm water basins and wastewater treatment ponds may increase the potential for mosquito-borne diseases in the area.



11.0 POPULATION

The 1990 state Department of Finance estimated population for the Town of Paradise was 26,786; however, the 1990 U. S. Census count for the town is 25,403. The growth forecast contained in the 1982 Paradise General Plan for 1990 was 28,580, so it is evident that actual population growth has not equaled previous estimates, most likely due in part to limitations upon sewage disposal systems. Estimated household size for 1990 is 2.4 persons per household.

Department of Finance housing estimates for 1990 reported a vacancy rate of 4.28 percent and a total of 11,652 housing units, while the 1990 U. S. Census reported a total of 11,633 housing units.

Table 11-1 reports population counts for each census year, beginning with 1960, including a 1975 special census conducted by the Department of Finance and sponsored by Butte County. Table 11-2 compares population growth in Butte County with the Town of Paradise for 1980-1990.

According to the 1990 Census, the ethnic composition of the town is 94.6 percent white; eight-tenths of one percent American Indian, Alaskan and Aleut; one percent Asian and Pacific Islanders; one-tenth of one percent Black; and 3.4 percent Hispanic.

Employment information available from the California Employment Development Department (EDD) for the Chico Metropolitan Statistical Area (which encompasses all of Butte County) indicates an annual average unemployment rate of 7.9 percent, as compared to a statewide rate of 5.1 percent for 1989. Data is not available for the Town of Paradise.

Employment projections for the Chico MSA forecast increases in employment in agriculture/forestry/fishing; construction and mining; some manufacturing categories; retail trade; finance, insurance, and real estate; services; and local government and education. No growth or decreases are forecast in food, lumber, and wood products manufacturing; transportation and public utilities; wholesale trade; and State and Federal government employment. The three largest employment sectors for the county are services (24.3 percent), retail trade (22.6 percent) and government (21.2 percent).

The population growth anticipated over the next fifteen years could average approximately 1.3 percent annually. The plan's growth management thrust is intended to keep residential construction and population growth near to that experienced over the past ten years. Carrying this projection forward will result in a population increase from the current 26,000 to approximately 31,692 by the year 2008. Using net rather than gross acreage, the build-out population projection is estimated at 31,377.

Build out projections contained in the *Paradise General Plan* are based primarily on a survey of existing land uses, the land use designations established by this plan, and the vacant land gross acreage town wide.



The numbers have been modified from those contained in the May 1992 draft *General Plan*, consistent with the text revisions directed by the General Plan Revision Steering Committee in December of 1992.

**TABLE 11-1
HISTORICAL POPULATION GROWTH**

Year	Population	Percentage Annual Increase
1960	9,750	
1970	14,539	4.9
1975	19,239	3.2
1980	22,571	1.7
1990	25,403	1.3

Source: U. S. Census, State Department of Finance.

TABLE 11-2
POPULATION TRENDS 1980-1990

Jurisdiction	1980	Percentage of County Total	1990	Percentage of County Total
Butte County	143,851		182,085	
Incorporated	63,365	44.0	81,940	45.0
Unincorporated	80,486	56.0	100,145	55.0
Town of Paradise	22,571	15.7	25,403	13.9

Source: U. S. Census Bureau, 1980,1990; State Department of Finance Estimates, 1990



12.0 HOUSING

12.1 HOUSING PROFILE

As described in Section 11.0 above, the population of Paradise has grown moderately since 1980, at an average annual rate of 1.3 percent. A review of census data and Department of Finance (DOF) estimates indicates that the town's housing stock expanded by 1,510 units during the period 1980-1990, an average annual increase of 151 units (see Table 12-1). The actual growth of the housing inventory, however, has not been constant over time (see Table 12-2).

An examination of census data provides insight into the changing demand for different types of dwelling units within the town. The three basic types of housing units for which data are presented are single family units, multiple family units (which range in size from duplexes to larger apartment complexes containing several units), and mobile homes located in mobile home parks and on individual lots.

The predominant type of dwelling unit in Paradise continues to be the conventional single family residence. In contrast to statewide trends, single family units in Paradise increased from 69.0 percent of the total housing stock in 1980 to 72.4 percent in 1990, as indicated in Table 12-3. Statewide trends indicate a decline in the percentage of single family dwellings, due primarily to an increased market share of lower-priced mobile homes and rental apartment units.

Comparison of the growth rates of the three dwelling types in Paradise illustrates the change in distribution of dwelling type. From 1980 to 1990, single family dwellings increased by only 20.8 percent, while multiple family units experienced a significantly higher increase of 48.0 percent and the number of mobile homes declined by 13.5 percent. The proportion of the town's housing stock comprised of multiple-family units has slowly but steadily increased from 8.0 percent of the total supply in 1980 to 10.3 percent in 1990. Construction of new multiple-family dwellings in Paradise is significantly constrained by the lack of a sewer system.

The percentage of the local housing stock comprised of mobile homes, both in parks and on individual lots, has historically been higher than average in Paradise, due to its rural nature and the larger senior citizen population. The percentage of mobile homes declined from 23.0 percent of the housing stock in 1980 to 17.3 percent in 1990. Fewer new permits for mobile home installations are being issued in proportion to the number of new, custom single family dwellings being constructed.



Before current housing needs can be understood and future needs anticipated, housing occupancy characteristics must be identified. An analysis of household size, household growth, tenure and vacancy trends complements the previous analysis of population and housing characteristics during the same time period.

A review of available data shown in Table 12-4 indicates that the number of households in Paradise increased by 1,613 during the period 1980-1990, a 16.9 percent increase. The small increase in the average household size in Paradise during the 1980s is in contrast to a statewide trend toward smaller households (see Table 12-5). Department of Finance estimates for 1990 indicate that the average household size increased to 2.36 persons per household in 1990. This may be attributable to a decreased percentage of elderly population and an increase in the number of families with children living at home.

Until 1990 Census data becomes available, it is not known whether the rate of homeownership within the Town of Paradise has increased or decreased during this decade. The statewide trend is toward a decreased rate of homeownership, due to the increased cost of housing. Table 12-6 estimates the number of owner-occupied and renter-occupied units based upon 1980 rates.

The vacancy rate is a measure of the general availability of housing. It also indicates how well the type of units available meet the current housing market demand. A low vacancy rate suggests that families may have difficulty finding housing within their price range; a high vacancy rate may indicate either the existence of deficient units undesirable for occupancy, or an oversupply of housing units. The 1980 and 1990 vacancy rates for Paradise are 5.2 and 4.28 percent, respectively.

TABLE 12-1
TOTAL HOUSING STOCK 1980-1990

Year	Number of Units	Percentage Increase 1980-1990
1980	10,123	
1990	11,633	14.9

Source: U. S. Census Bureau, 1980, 1990.

TABLE 12-2
RESIDENTIAL BUILDING PERMIT ACTIVITY
1985-1990

Year	Single-Family Units	Multi-Family Units	Mobile Home Units
1985	96	3	NA ¹
1986	135	8	NA ¹
1987	137	21	9
1988	162	14	11
1989	146	9	3
1990	98	0	10
TOTAL 1985-1990	774	55	33

¹ Mobile home information included with single-family unit count.

Source: Town of Paradise Community Development Department.

TABLE 12-3
TOTAL DWELLING UNITS BY TYPE OF STRUCTURE
1980-1990

Dwelling Type	1980		1990		1980-1990
	Units	% of Total	Units	% of Total	% Change
Single Family	6,985	69.0	8,439	72.4	+20.8
Multi-Family	810	8.0	1,199	10.3	+48.0
Mobile Homes	2,328	23.0	2,014	17.3	-13.5
Total Year-Round Dwelling Units	10,123		11,652		+15.1

Source: U. S. Census Bureau, 1980; Department of Finance estimate 1990.



12.2 HOUSING NEEDS

Existing Housing Needs

Like most municipalities in California, Paradise's goal of providing a decent home and suitable living environment for every family has not yet been achieved. The following analysis of current housing conditions documents Paradise's housing needs relative to various segments of the population.

Housing need is a complex issue, consisting of at least three major components: housing affordability, housing quality, and housing quantity. In addition, certain segments of the population have traditionally experienced unusual difficulty in obtaining adequate housing. Those unusual difficulties experienced by the elderly, the handicapped, female heads of household, large families, and the homeless are discussed as special needs in this section.

Housing Affordability

State housing policy recognizes that cooperative participation of the private and public sectors is necessary to expand housing opportunities to all economic segments of the community. A primary state goal is the provision of a decent home and a satisfying environment that is affordable. The private sector generally responds to the majority of the community's housing needs through the production of market-rate housing. There are many components involved in housing costs. Some of these factors can be controlled at the local level, others cannot. It is a primary goal of Paradise to adopt local policies and procedures which do not unnecessarily add to already escalating housing costs.

Some of the effects or problems which result from increased housing costs include the following:

- **Declining Rate of Homeownership:** As housing prices and financing rates climb, fewer people can afford to purchase homes. Households with median and moderate incomes who traditionally purchased homes compete with less advantaged households for rental housing. This can be expected to result in lower vacancy rates for apartment units and higher rents.
- **Overpayment:** The cost of housing eventually causes fixed-income, elderly and lower income families to use a disproportionate percentage of their income for housing. This causes a series of other financial problems, often resulting in a deteriorating housing stock because the costs of maintenance must be sacrificed for more immediate expenses (e.g. food, clothing, medical care, and utilities).



- **Overcrowding:** As housing prices climb, lower income households must be satisfied with less house for the available money. This can result in overcrowding which places a strain on physical facilities, does not provide a satisfying environment, and eventually causes conditions which contribute to both deterioration of the housing stock and neighborhoods. Buying a new home has become a major obstacle for many families, particularly first-time home buyers.

In this area, the median sale price of a home was \$100,000 in 1991. The household earning the median family income for Butte County of \$31,400 can theoretically afford a monthly housing payment of \$654, which is less than the \$692 payment required for a median priced home purchased with a ten percent down payment and financed at an 8.5 percent interest rate. A 1991 analysis of the components of monthly housing costs for a typical single family house costing \$100,000 purchased with a ten percent down payment and financed at 8.5 percent for thirty years, indicates that a \$10,000 reduction in land development costs results in a ten percent reduction in monthly payment, while a one percent reduction in takeout financing interest rates also results in a 9.2 percent reduction in monthly payment. The 1991 average sales price of a mobile home in a mobile home park was \$31,900. Financed at an 8.5 percent interest rate for twenty years with a ten percent down payment, the monthly housing payment would be \$249. Although this payment does not include park rental fees, with fees it does fall within the monthly housing payment that is affordable to the median income family.

Also, in this area 23.9 percent of housing units are renter-occupied. In 1990, average rental rates in Paradise were \$296 for a one-bedroom apartment, \$444 for a two bedroom apartment, and \$412 for a three-bedroom apartment, and duplex rents ranged from \$348 to \$465. Rental rates for houses ranged from \$319 to \$676, and for mobile homes from \$324 to \$542 (*A Multifamily Rental Housing Strategy*). These rents are, for the most part, within the affordable range for the median income family.

The magnitude of the affordability problem is discussed in the 1991 Butte County Association of Governments *Regional Housing Allocation Plan*. The definition of housing "needs" is those renters and homeowners paying over twenty-five percent of their gross income for shelter. This plan has grouped Paradise's households into four household income categories, including very low, low, moderate and above moderate income. Table 12-7 indicates the existing and projected 1997 numbers of households that paid or will pay in excess of twenty-five percent of their income for housing by income group.

Housing Quality

A windshield housing condition survey was completed in the Town of Paradise in March 1991. A survey of multiple family units only was completed in February 1990. The results of both surveys are presented in Tables 12-8 and 12-9. Both surveys indicate that the overwhelming majority of dwelling units in Paradise are in sound condition.

The rating system used in both surveys was based on the format prescribed by the California Department of Housing and Community Development. The rating system evaluates residences based on the exterior condition of five components: roof, foundation, siding, windows, and doors.



Residences were rated as one of five possible condition categories: sound, minor, moderate, substantial, and dilapidated. These terms are defined as follows:

- Dwelling units rated as "*sound*" had no visible repair needs or needed one or two deferred maintenance repairs, such as painting, patching, or window repair.
- Dwelling units rated in need of "*minor*" rehabilitation required several deferred maintenance repairs and/or had one replacement repair need (such as the re-sheathing of the roof, replacement of siding, replacement of doors or windows, or partial foundation work).
- The "*moderate*" rehabilitation category was assigned to dwelling units that required two replacement repairs plus deferred maintenance. Complete replacement or installation of a foundation system and structural roof repair or replacement also typify "*moderate*" rehabilitation.
- A dwelling unit in need of "*substantial*" rehabilitation requires the replacement of three or more components.
- "*Dilapidated*" dwelling units are those which require the replacement of virtually all components and which are not financially feasible to repair.

While age certainly is contributory to housing quality problems, another factor which partially explains substandard housing is overcrowding. Table 12-10 shows that 2.5 percent of the total housing units within Paradise were overcrowded in 1980, a comparatively low number which undoubtedly can be ascribed to the high elderly population. The U.S. Census Bureau defines overcrowded housing units as those with in excess of 1.00 person per room average. The extent of the overcrowding problem in Paradise is shown in Table 12-10. However, the actual causes cannot be determined without conducting special studies.

Overcrowding is often reflective of one of three conditions: a family or household living in too small a dwelling; a family housing extended family members (i.e. grandparents or grown children and their families living with parents); or a family renting inadequate living space to non-family members (i.e. families renting to migrant farm workers). Whatever the cause of overcrowding, there appears to be a direct link to housing affordability. Either homeowners/renters with large families are unable to afford larger dwellings, older children wishing to leave home cannot do so because they cannot qualify for a home loan or are unable to make rental payments, grandparents on fixed incomes are unable to afford suitable housing or have physical handicaps that require them to live with their children, families with low incomes may permit overcrowding to occur in order to derive additional income, or there is an insufficient supply of housing units in the community to accommodate the demand. According to a *Multifamily Rental Housing Strategy*, three-bedroom (and larger) apartments are very scarce in Paradise.



Special Needs

State housing law requires that the special needs of certain disadvantaged groups be addressed. The needs of the elderly, disabled, large families, and female heads of household are described below.

- **The Elderly.** The special housing needs of the elderly are an important concern of the Town of Paradise because this group comprises a larger-than-average share of the population. Their special characteristics include fixed incomes and special needs related to housing construction and location. Location-based needs include access to medical, shopping and public transit facilities. 1990 state census data reveals that 7,770 town residents, or 30.58 percent of the total population, were sixty-five years of age or older in 1990, compared to 6,487 persons (28.7 percent) in 1980.

The Multi-Family Rental Housing Strategy Plan, prepared for Paradise by Connerly and Associates in 1990, indicated that seventy-three percent of the multi-family rental housing units (apartments, duplexes, multiplexes) in Paradise are occupied by citizens sixty-two years of age or older.

Elderly households in Paradise may have two special needs: 1) low income elderly households may not have enough income to properly maintain their homes; and 2) some may no longer be able to live in their homes. The former may need financial assistance for housing rehabilitation, while the latter may need to move to an assisted situation for older adults.

Estimate of Need. The estimate of the two special housing needs of the elderly population in Paradise is relatively high. The *Paradise Multifamily Rental Housing Strategy* report, prepared by Connerly and Associates in 1990 revealed that the majority of renters in the town are over the age of sixty-five. However, it is estimated that a significant amount of elderly persons still own their homes, and could be facing the two identified critical needs.

Existing and Projected Resources The primary resources available to address the critical housing needs of the elderly population are: 1) federal government entitlement city funds; and 2) an increase in General Plan land use designations that provide an increased opportunity for alternative housing for the elderly.

The town has prepared a comprehensive housing affordability strategy report that focuses on housing rehabilitation.

- **Physically Disabled.** Table 12-12 indicates the number of persons in 1980 who had disabilities that either restricted working or restricted them from using public transportation. It should be noted that the listing of those persons with transportation disabilities includes a large number of persons sixty-five years of age and older. As indicated, 4.6 percent of Paradise's households contained members who were unable to work because of a disability and 3.8 percent experienced transportation disabilities. Estimates for 1990 are also included in this table.



Physically disabled persons need accessible and functional shelter that accommodates wheelchairs and walking aids. Special housing features may include entry way ramps, larger door and hall widths, grab bars in bathrooms, etc.

Estimate of Need. As indicated in the discussion above and illustrated in Table 12-12, there is a significant population of physically disabled in the Town of Paradise. It is assumed that the need for accessible housing and functional shelter is high because the town does not experience a frequent rate of building permit activity dedicated to retrofitting existing rental or other dwelling units with entry way ramps, expanded door widths, etc.

Existing and Projected Resources. Projects involving compliance with the American Disabilities Act requirements are eligible for funding with the federal government entitlement city funds. The Town of Paradise intends to utilize a portion of the funds for this purpose.

- **Large Families.** Large families are indicative not only of those households that require larger dwellings to meet their housing needs, but also are reflective of a large number that live below the poverty level. Table 12-13 indicates the numbers and percentages of those households that had five or more members of 1980 and 1990.

The primary housing need of low-income large families is affordable multi-bedroom rental and ownership housing.

Estimate of Need. Large families do not make up a significant portion of the Paradise community. As Table 12-13 illustrates, only 6.7 percent of the total number of housing units are occupied by large families. However, 6.2 percent of the total are renters, and the *Paradise Multifamily Rental Housing Strategy* identifies large rental units as a need.

Existing Resources. The federal entitlement city funding will be used, in part, for rental housing and onsite sewage disposal system rehabilitation programs. This will assist in the preservation and enhancement of the large rental unit housing stock town wide.

- **Female Heads of Household.** Families with female heads of household experience a higher than average incidence of poverty as well. Table 12-14 lists the numbers and percentages of female-headed households for 1980 and 1990.

A rental housing survey prepared for the Town of Paradise by Connerly and Associates in 1990, indicates that there are a total of 790 multi-family rental units in the community. Four percent were occupied by female heads of household with children. Extrapolating this percentage over the total number of rental units in Paradise reveals approximately 112 female heads of household with children that rent housing in Paradise. The 1990 census data reveals that there are another 476 female heads of household within the town.



Female heads of households need low-cost family housing because they are usually strapped with the responsibilities of rearing children and earning an income. Recreation and child care facilities associated with housing is another need of single women raising children.

Estimate of Need. While the estimate of need is not considered high in terms of the percentage of female heads of households compared to other groups within the town, there is a need that must be addressed.

Existing Resources. The General Plan land use designations provide ample opportunity for low cost rental housing opportunities. The federal government entitlement city funding can be used to assist the rehabilitation of existing low cost housing units and failing onsite sewage disposal systems.

- **Farm Workers.** Although there are a few remaining agricultural parcels in Paradise, mostly orchards, the farm labor required is not sufficient to create a resident farm worker population. In the 1991 *Regional Housing Allocation Plan*, the Butte County Association of Governments (BCAG) determined that there would be 100 additional farm worker households countywide by 1997, of which Paradise's share would be twelve households. However, BCAG concluded that Paradise is not expected to house farm workers due to its location.
- **The Homeless.** The Butte County Community Action Agency (CAA) is responsible for assisting the homeless population in Butte County, including the Town of Paradise. This agency does not keep records for the numbers of homeless found in individual jurisdictions within the county. There is currently no emergency shelter or transitional housing within the Town of Paradise. The CAA has reported that, during the summer months, there is normally a transient homeless population that camps in the Upper Ridge area north of the town. The CAA, which maintains a Paradise office, refers the small numbers of homeless it serves in Paradise to shelters in Chico and Oroville. According to the agency, it is meeting the needs of the homeless in Butte County (Lorene Eagleson, pers. comm., February 1992).

Extent and Type of Programs Providing Food and Services

Help-4-People and the Butte Community Action Agency are two nonprofit agencies within the Town of Paradise providing assistance to homeless persons within the area. Help-4-People is supported by fraternal and civic service organizations, ministerial associations, churches, business and individual volunteers. Help-4-People offers aid to transients in the form of food distribution every Tuesday and Thursday and agency referrals when needed. The Butte County Community Action Agency also offers aid in the form of distribution of commodities on the third Thursday of each month and agency/shelter referrals.



Social Service Programs for Homeless

Although no social service programs for the homeless exist within the Town of Paradise, the Butte Community Action Agency is able to make the necessary referrals to other programs within Butte County.

Extent and Type of Social Service Programs Targeted to Prevent Low-income Individuals From Becoming Homeless

The Housing Authority of Butte County offers assisted housing to those low-income persons who meet the requirements of Federal Preference. Help-4-People and Butte Community Action Agency offer their commodity assistance to low-income individuals and families as well. Other commodity assistance programs are run through local churches. In addition to commodity assistance, CAA also offers assistance with electric and gas bills for low-income families.

TABLE 12-4
TOTAL HOUSEHOLDS 1980-1990

Year	Number of Households	Percentage Increase 1980-1990
1980	9,540	
1990	11,153	16.9

Source: U. S. Census Bureau, 1980; Department of Finance estimates, 1990.

TABLE 12-5
AVERAGE NUMBER OF PERSONS PER OCCUPIED
DWELLING UNIT 1980-1990

Year	Average Household Size	Percentage Change 1980-1990
1980	2.31	
1990	2.36	2.0

Source: U. S. Census Bureau, 1980; Department of Finance Estimates, 1990.

TABLE 12-6
HOUSING TENURE 1980-1990

Year	Owner Occupied	Percentage	Renter Occupied	Percentage
1980	7,263	76.1	2,277	23.9
1990	8,853	76.1	2,780	23.9

Source: U.S. Census Bureau, 1980; 1990 estimates and calculations, QUAD Consultants.

**TABLE 12-7
PARADISE HOUSEHOLDS SPENDING
OVER TWENTY-FIVE PERCENT OF GROSS INCOME FOR HOUSING
1991-1997**

Year	Total Households	Income Groups							
		Very Low Income ¹	Percentage of Total	Other Lower Income ²	Percentage of Total	Moderate Income ³	Percentage of Total	Above Moderate Income ⁴	Percentage of Total
1991	11,178	2,347	21	2,012	18	2,907	26	3,902	35
1997	12,503	2,625	21	2,251	18	3,251	26	4,376	35
Year	Total Households	Income Groups Spending Over Twenty-Five Percent for Housing							
		Very Low Income ¹	Percentage of Total	Other Lower Income ²	Percentage of Total	Moderate Income ³	Percentage of Total	Above Moderate Income ⁴	Percentage of Total
1991	11,178	2,347	100	1,509	75	1,454	50	0	0
1997	12,503	2,625	100	1,688	75	1,626	50	0	0

Source: Butte County Association of Governments, *Regional Housing Allocation Plan*, 1991.

- ¹ Income not exceeding fifty percent of the median family income for Butte County.
- ² Income between fifty and eighty percent of the median family income for Butte County.
- ³ Income between eighty and 120 percent of the median family income for Butte County.
- ⁴ Income above 120 percent of the median family income for Butte County.

TABLE 12-8
HOUSING CONDITION SURVEY RESULTS
SINGLE FAMILY DWELLINGS AND MOBILE HOMES

Condition	Single Family		Mobile Homes		Total by Condition	
	No.	Percent	No.	Percent	No.	Percent
Sound	7,784	92.5	2,159	87.6	9,943	91.4
Minor	375	4.5	260	10.6	635	5.8
Moderate	151	1.8	30	1.2	181	1.7
Substantial	58	0.7	7	0.3	65	0.6
Dilapidated	51	0.6	8	0.3	59	0.5
Total Units	8,419		2,464		10,883	

Source: QUAD Consultants, 1991.

**TABLE 12-9
HOUSING CONDITION SURVEY RESULTS
MULTIPLE FAMILY DWELLINGS**

Condition	Duplex		3-4 Units		6-9 Units		10+ Units		Condos		Total by Condition	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Sound	78	88.4	51	76.1	72	100.0	410	97.4	150	100.0	761	95.6
Minor	2	0.02	12	17.9	0	0.0	11	2.6	0	0.0	25	3.1
Moderate	4	0.05	4	6.0	0	0.0	0	0.0	0	0.0	8	1.0
Substantial	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Dilapidated	2	0.02	0	0.0	0	0.0	0	0.0	0	0.0	2	0.0
Total Units	86		67		72		421		150		796	

Source: Connerly and Associates, Inc., 1990.

**TABLE 12-10
OVERCROWDING, 1980-1990**

	1980 Housing Units			1990 Housing Units		
	Owner	Renter	Total	Owner	Renter	Total
Total Housing Units	7,124	2,182	9,540	8,853	2,780	11,633
Overcrowded (1.01 + persons per room)	139	95	234	168	122	290
Incidence of Overcrowding (%)	1.9	4.4	2.5	1.9	4.4	2.5

Source: U. S. Census Bureau, 1980; 1990 estimates and calculations, QUAD Consultants.

TABLE 12-11
ELDERLY POPULATION 1980-1990

Year	Number Age 65+	Percent of Total
1980	6,487	28.7
1990	7,292	28.7

Source: U. S. Census Bureau 1980, 1990; 1990 estimate and calculation by QUAD Consultants.

TABLE 12-12
DISABLED POPULATION 1980-1990

Year	Worker Disability	Percentage of Population	Transportation Disability	Percentage of Population
1980	1,027	4.6	862	3.8
1990	1,169	4.6	966	3.8

Source: U. S. Census Bureau, 1980; 1990 estimates and calculations, QUAD Consultants.

**TABLE 12-13
LARGE FAMILIES 1980-1990**

Household Type	1980 Housing Units			1990 Housing Units		
	Owner	Renter	Total	Owner	Renter	Total
Total Housing Units	7,263	2,277	9,540	8,853	2,780	11,633
Large Families (5+ persons)	493	142	635	602	172	774
Rate of Large Families (%)	6.8	6.2	6.7	6.8	6.2	6.7

Source: U. S. Census Bureau, 1980; 1990 estimates and calculations, QUAD Consultants.

TABLE 12-14
FEMALE HEADS OF HOUSEHOLD 1980-1990

	1980	1990
Female-headed Households (2+ persons per household)	562	658
Total Households	9,540	11,153
Percentage of Total Households	5.9	5.9

Source: U. S. Census Bureau, 1980; 1990 estimates and calculations, QUAD Consultants.



12.3 PROJECTED HOUSING NEEDS

Information presented in Sections 11.0 and 12.0 above documented the recent growth which has occurred in the population and housing stock of Paradise. Between 1980 and 1991, the population increased by 14.4 percent. The portion of the statewide housing need assigned to Butte County during the period January 1, 1991 to July 1, 1997 totals 12,165 dwelling units. The number of households is projected to increase by 9,866 countywide.

Market Demand for Housing

The Paradise and Butte County regional real estate market, like most of the rest of California, is relatively slow at the time that this *Housing Element* is written. At the same time, it is one of the more affordable housing markets in the state. The cyclical nature of real estate makes it difficult to forecast the character of market demand during the planning period. Local sources have indicated that the supply of rental apartments is relatively scarce in Paradise, although there is a greater available supply of rental houses.

Projected Housing Demand and Basic Construction Need for all Income Levels

The 1991 *Regional Housing Allocation Plan* prepared for the Butte County Association of Governments establishes both the projected need for nonmarket rate housing and the distribution of the projected need to each jurisdiction within the region. The need for nonmarket rate housing is defined as households in the very low, low, and moderate income groups which pay over twenty-five percent of total income for housing. It is assumed that households with an above-moderate income are not in need of economic aid.

A projected total need for 1,176 households is given in the *Regional Housing Allocation Plan* for the Town of Paradise between 1991 and 1997. This total was subsequently adjusted by BCAG to take into consideration additional vacancies, housing replacement need, farm workers, students and other adjustments, for a total of 1,568 households.

The plan establishes the basic new construction need for the Town of Paradise at 1,350 dwelling units. This allocation was based on the assumption that the maximum number of dwelling units that Paradise can accommodate is 1,350 between 1991 and 1997, due to sewer constraints and topographic conditions. The basic construction need for Paradise and the other Butte County jurisdictions by income level is presented in Table 12-15. This total may be translated into an annual new construction need of 193 units.



Conversion of Assisted Housing Units

State housing element law requires that housing elements address subsidized housing units at risk of conversion to market rate units. Two developments have been identified in Paradise which are at risk of conversion: Kathy Court, located at 1561-1565 Kathy Court, a 236 (J) (1) project with family rental units; and Paradise Gardens, a forty-eight unit Section 8 new construction project.

Kathy Court is a mortgage-based subsidy project subject to the provisions of the Low Income Housing Preservation and Resident Homeownership Act (LIHPRHA). It is currently eligible to proceed under the provisions of LIHPRHA because it is within two years of its initial prepayment eligibility date.

Paradise Gardens has a FmHA Section 515 rural rental housing mortgage loan with a Section 8 conventional new construction contract (mortgage and rental subsidies). **April 4, 1994** represents the Section 8 contract opt-out date.

Accordingly, both of these projects are or will be at risk of conversion to market rate units during the next ten years. The Town of Paradise currently does not have the financial ability to purchase and assure preservation of either of these projects, and there is no nonprofit organization within the town that is involved with or capable of purchasing them. Potential future preservation resources may include federal entitlement city funding. If this funding source is available, and if the at risk projects are eligible, the town may choose to attempt to assist the preservation of one or both projects.

TABLE 12-15
BASIC NEW CONSTRUCTION NEED BY INCOME GROUP

Income Groups									
Jurisdiction	Very Low		Other Low		Moderate		Above Moderate		Total
Biggs	74	30%	31	20%	31	20%	45	30%	154
Chico	1,005	26%	690	18%	769	20%	1,383	36%	3,847
Gridley	101	28%	64	18%	71	20%	120	34%	356
Oroville	296	26%	203	18%	226	20%	405	36%	1,130
Paradise	407	30%	243	18%	270	20%	430	32%	1,350
Unincorporated	1,550	29%	959	18%	1,066	20%	1,753	33%	5,328
Total	3,406	28%	2,190	18%	2,133	20%	4,136	34%	12,165

Source: Butte County Association of Government, *Regional Housing Allocation Plan*, 1991



12.4 RESIDENTIAL LAND RESOURCES/INVENTORY

In order to properly plan for future housing needs, undeveloped lands available for housing within the town and within projected growth areas must be identified. It is assumed that this growth and development will occur upon annexation to the town. The *Regional Housing Allocation Plan* assumes that development will be concentrated in those communities in which public facilities can be constructed or expanded between 1991 and 1997.

Available Land Inventory

Table 2-2 of Volume I, *Policy Document*, itemizes land planned for growth and development within and around the Town of Paradise. It includes vacant lands presently within the Town of Paradise and lands to the south of the town limits within the secondary study area which are planned for residential development, and that are not inordinately constrained by topography and the current lack of a community collection sewer system. Some of the lands in the secondary study area are already rezoned for residential use, and will be zoned to an appropriate residential classification upon annexation to the town. It is important to note that the county has adopted a *Paradise Urban Reserve Policy Statement* and has designated this area as "Urban Reserve" (see Figure 16-1). The policy provides that the county's land use policy, zoning and subdivision shall be coordinated with the Town of Paradise. Please refer to Section 16.1 for a more complete description of this policy.

Table 2-2 of Volume I indicates the projected holding capacity of Paradise based upon vacant lands planned for development. Table 2-1 of Volume I, presents the allowed densities and land use intensity for each residential land use classification in the *Paradise General Plan*.

The tables indicate that the amount of land available (land inventory) for different types of residential development, served or planned to be served by public facilities, is more than adequate to meet anticipated growth, and to provide for the estimated number of new housing units determined necessary by the *Regional Housing Allocation Plan* to provide new housing opportunities for low and lower income households.

The primary land use designations that will provide low and moderate income housing opportunities are "M-R" (Multi-Family Residential: ten dwelling units per net acre), "T-R" (Town-Residential: three dwelling units per net acre), "C-C" (Central-Commercial: ten dwelling units per net acre), and "C-S" (Community-Service: ten dwelling units per net acre).



12.5 DEVELOPMENT CONSTRAINTS

A number of factors affect the ability of the private sector to respond to the demand for housing and constrain the maintenance, improvement or development of housing for all economic groups. Constraints, however, can generally be translated into increased costs to provide housing and fall into two basic categories: governmental and nongovernmental.

Governmental Constraints

Governmental constraints are potential and actual policies, standards, requirements, or actions imposed by the various levels of government or development. Although federal and state programs and agencies play a role in the imposition of governmental constraints and increases in housing costs, they are beyond the influence of town government and cannot be effectively addressed in this document. An analysis of potential local governmental constraints is presented below.

Land Use Controls

Land use controls are basically minimum standards included within the town's zoning and subdivision ordinances. Zoning is a means of ensuring that the land uses in a community are properly situated in relation to one another, providing adequate space for each type of development. Zoning regulations control such features as height and bulk of buildings, lot area, yard setbacks, population density, building use, etc. If zoning standards are too rigid and do not allow sufficient flexibility, development costs could increase, and interest in development may decrease.

The subdivision ordinance governs the process of converting raw land into building sites. It allows the town to control the internal design of each new subdivision so that its pattern of streets, lots, public utilities, and any amenities will be safe, pleasant and economical to maintain. As with zoning, overly restrictive standards will result in higher land development costs and/or lack of interest in development.

The Town of Paradise offers several incentives in its zoning ordinance and subdivision ordinance, including the following:

- The zoning and subdivision ordinances were comprehensively amended and rewritten in 1988 and 1990, respectively, updating and streamlining many requirements.
- The zoning ordinance was amended to allow small (750 square feet) second dwellings in single family zones with a site plan review permit. These "granny flats" can be rented out and are not



considered in density limitations. In addition, the zoning ordinance allows "two-family" residences in single-family residential zones with the securing of a use permit.

- The second dwelling units and two-family residences represent affordable housing opportunities in the Paradise community. Because of the size limitations on the secondary dwelling units, they most often are rented at an affordable price. It is estimated that the number of existing secondary dwelling units within the town limits may be as high as 500. There is significant opportunity for additional units townwide.
- The town's present requirements for onsite and offsite improvements are considerably less than most California cities of comparable size and development and are not considered to be a significant impediment to residential development. In order to preserve the rural character of the community, asphalt berms and walkways have been preferred to sidewalks and concrete curbs and gutters in single-family areas.
- The town changed its requirement of two parking spaces per new dwelling unit to a graduated scale based on the square footage of the unit. This allows for a reduced number of required parking spaces for multi-family residential development. For example, units less than 700 square feet in size now only require 1.2 parking spaces, and units exceeding 1,200 square feet in size now require 1.8 parking spaces.
- The Town of Paradise recently reorganized the planning, engineering and building departments into a Community Development Department to streamline permit processing and increase public service efficiency. This has dramatically improved the processing of building and planning permits for local housing projects by improving and expediting interdepartmental communication, and reducing redundancy of work.
- The zoning ordinance does not distinguish between conventional houses and mobile homes on permanent foundations within rural residential and single family residential zoning districts. In addition, the zoning ordinance includes a mobile home combining zone which permits the use of mobile homes not placed on a permanent foundation as dwellings in the Rural Residential-3, Rural Residential, Single-Family Residential, Multiple-Family, Multiple-Family/Professional, Rural Residential-10 and Rural Residential-20 zones.
- Lot merger provisions have been included in the subdivision ordinance to assist in the assembly of small parcels into larger building sites.
- The town's site plan review process establishes standards that can be reviewed by a developer, prior to submittal of an application, to determine the requirements that will apply to the project. A site plan review is conducted before submittal of building plans, and reduces costs by identifying any problem areas prior to development of costly working drawings.



- The zoning ordinance includes a planned development combining zone that provides flexibility for planned developments which do not conform in all respects with the designated land use pattern and/or ordinance requirements.
- In terms of development standards for single and multi-family residential development, the town zoning ordinance is both clearly written and liberal. Lot coverages, height restrictions, setbacks and floor area ratio standards are straight forward and not considered an impediment to residential construction.

Building Codes

Building codes regulate the physical construction of dwellings and include plumbing, electrical and mechanical divisions. The town adopts and follows the Uniform Building Code as established by state law. The town operates a one-stop permit processing procedure.

Site Improvements

Site improvements are regulated by the town subdivision ordinance, and through conditions and standards imposed through the town's site plan review process. Site improvements include required offstreet parking, roads, sidewalks, landscaping, walls, and the storm drainage system. There is currently no sewer system, and water system requirements are handled by the appropriate special district or private water company. The town does not require any improvements other than those deemed necessary to maintain the public health, safety and welfare.

Onsite Wastewater Maintenance District

During the latter part of 1992, the town established an onsite wastewater maintenance district that will monitor the performance of individual septic tank and leachfield systems, and oversee the enforcement of the town sewage disposal ordinance. Existing systems serving rental units that are experiencing failure will ultimately be repaired and/or upgraded. This will result in the potential increase in opportunities for affordable housing units, or at the very least, increase the preservation of existing units.

Fees

Although development processing fees do contribute to the total cost of development, and therefore housing, the fees charged by the Town of Paradise are very modest in comparison to fees charged by other



cities and counties throughout the state. However, the town is not the only public agency which imposes fees on new development. Impact and/or hookup fees are also charged by the Paradise Unified School District, the Paradise Irrigation District, the Lime Saddle Community Services District, the state (for review of environmental documents by the Department of Fish and Game), and the County of Butte.

By law, fees cannot exceed the cost of providing the particular facility or service for which they are charged. A recent study completed for the town has revealed that for many years, the fees charged by the Town of Paradise have not even recovered the cost to the town of providing facilities and services. The town is in the process of updating its fee schedule to reflect a greater rate of recovery. Building permit fees are as established by the currently adopted edition of the Uniform Building Code, and charges are consistent with most cities and counties.

Building permit fees for residential construction vary depending upon the valuation of the project. Site plan review permit and use permit fees for multi-family residential developments and other alternative housing projects range from \$225 to \$750 depending upon the scale and intensity of the actual project. However, discretionary review is not required in every zoning district for all residential projects.

The Town of Paradise does not have a comprehensive town wide development impact fee program that would adversely impact housing projects. The Paradise Unified School District impact mitigation fee program does have an exemption for housing development projects serving the elderly population, which assists the town to promote and support this type of housing opportunity within the community.

Public Facilities and Services

As discussed elsewhere in this document, sewer and water service place significant constraints upon existing and planned residential development in Paradise. Water service is provided by special districts and is not currently under the town's control. Water service may not always be available at a particular point in time or location in accordance with the town's timetable for growth and development. The policies of the *General Plan* call for a feasibility study of consolidation and/or acquisition of these districts by the town.

Even with construction of the proposed community collection sewer system, large areas of existing and planned residential development will remain unsewered during the time frame of the plan. This limitation was acknowledged by BCAG in the *Regional Housing Allocation Plan*, which adjusted the town's share of regional housing needs under the assumption that the maximum amount of housing it can accommodate is 1,350 dwelling units between 1991 and 1997. At the densities and minimum parcel sizes necessary to properly accommodate new septic systems, the production of affordable housing becomes problematic. However, the formation of an onsite wastewater maintenance district, in 1992, and the implementation by town staff may lead to creative alternatives in terms of sewage disposal for residential construction projects.



Nongovernmental Constraints

Nongovernmental constraints are those generated by the private sector which are beyond the control of local government, as well as physical/environmental constraints. With respect to Paradise, these include availability and cost of financing, price of land, construction costs, consumer preference, and topography/soil suitability.

Availability and Cost of Financing

Interest rates for both construction and take-out financing probably have more impact on housing than any other factor, at least in the short term. When interest rates are high, or financing is not generally available, an increasing number of households cannot afford home ownership even if housing prices are affordable. A 1992 analysis of the components of monthly housing cost for a median-priced single family house costing \$100,000, purchased with a ten percent down payment and financed at 8.5 percent for thirty years, indicates that a \$10,000 reduction in land and development costs results in a ten percent reduction in monthly payment, while a four percent increase in take-out financing interest rates results in a thirty-eight percent increase in the monthly payment. In the Paradise area, the median sale price of a three-bedroom home was \$100,000 in 1991, and is \$31,900 for a mobile home in a mobile home park.

To mitigate the impact of high interest rates, when they occur, one of the few options available to local government is to find a means of subsidizing those rates for the home buyer and/or developer. This has been accomplished in the past primarily by the sale of mortgage revenue bonds, often coordinated at the county level. This process has been complicated by changes in federal law and state caps on the amount of bonds that can be issued statewide. State and federal mortgage subsidy programs are available at various times to qualifying projects and developers. While mortgage interest rates are currently at their lowest point in twenty years at the time this is written, the availability of construction and development financing is very tight, primarily in response to savings and loan institution failures and foreclosed development projects on the national level.

Financing for housing construction or rehabilitation loans is generally available. The securing of federal entitlement city funding will greatly increase the availability of local funding programs for housing and onsite sewage disposal rehabilitation projects."

While there are no definitive "blighted" or "slum" areas in the community, the land inventory program has identified a number of both rental and owner occupied housing units and sewage disposal systems in need of repair and rehabilitation. These areas have been targeted for low-interest rehabilitation loan programs.

Price of Land



According to the California Building Industry Association, the cost of land represents an ever-increasing proportion of the total housing development cost. In 1980, land cost represented approximately thirty percent of the cost of a new home in California, but by the end of the decade that component accounted for nearly thirty-five percent of the cost. In Butte County, land costs are still reasonable compared to other, similar areas in California. In Paradise, the average cost of a one acre single family lot ranges from \$32,300 to \$50,340. The average cost of a multiple family lot is difficult to estimate due to the small number and unique characteristics of such lots. The low density (one acre) of a typical single family lot and the scarcity of multiple family sites are attributable to the lack of a sewer system. The policies of the *General Plan* and imminent construction of a sewer system will address these constraints during the time frame of the *Housing Element*.

Measures available to local government to address land costs include the use of redevelopment funds to write down land costs, and development of housing by a nonprofit corporation or the Housing Authority. Use of surplus government-owned land for housing is an option not often available to a small town or city, due to a general lack of suitable publicly-owned land. However, this option should be kept in mind when such an opportunity occurs. Finally, attempting to stabilize or reduce land prices through increasing the supply of available land can only be effective if a full range of public services and facilities are available at a reasonable cost.

Cost of Construction

Rising costs of labor and materials have contributed to nongovernmental constraints on housing development and improvement. These costs, plus energy costs, formed a substantial part of housing cost increases during the 1970s, increasing by ten percent during that decade. Labor and materials costs continued to increase during the 1980s. The cost of wood is expected to continue to increase due to significant projected cutbacks in timber harvesting in the United States for environmental reasons. Labor costs for publicly-constructed housing are higher than for privately-constructed housing due to the requirement to pay prevailing wage rates, which in an area such as Butte County are significantly higher than local wage rates.

The total cost to the local developer for housing project financing, materials, fees, and labor are not considered significantly prohibitive in Paradise. Financing, materials and labor costs in the community are similar, if not identical to other communities in Northern California. The development impact fees are considerably less in Paradise than in other cities in Butte County.

Local governments can use Community Development Block Grant (CDBG) funds and redevelopment funds to finance infrastructure improvements (e.g. water and sewer lines), which assist in lowering housing costs. The town is considering applying for CDBG funds to assist with the construction of the sewer system.

Consumer Preference



Part of the increase in housing costs in the 1980s has been due to consumer preference and lifestyle expectations regarding dwelling unit size and amenities. All of these lifestyle choices have costs associated with them. As housing costs and/or interest rates make detached single family dwellings less affordable, alternatives such as smaller lots, smaller units, and attached housing become more acceptable, but are still not the housing of choice for the majority of households. Local government can assist in making a variety of housing types available through permitting higher densities, zero-lot-line housing and smaller lots; only, however, if infrastructure permits.

Topography/Soil Suitability

The steeper slopes characteristic of the large canyons east and west of the town, and smaller canyons to the south, limit residential densities and entirely preclude development of some areas. Grading requirements on steeper slopes increase the cost of housing as well. In the *Regional Housing Allocation Plan*, BCAG acknowledged this limitation and adjusted Paradise's share of the regional need accordingly. Soil suitability for septic systems affects the minimum parcel size as well as septic system installation and monitoring requirements, all of which impact the cost of housing.



12.6 EVALUATION OF THE PREVIOUS HOUSING ELEMENT

Pursuant to Section 65588 of the Government Code, the Town of Paradise has reviewed its 1985 *Housing Element* and has evaluated the appropriateness of its housing goals, objectives, and policies in contributing to the attainment of the state housing goal, the effectiveness of the *Housing Element* in attainment of the town's housing goals and objectives, and the progress of the town in implementation of the *Housing Element*. The new *Housing Element* has been updated to reflect the results of this review.

Results of Previous Goals, Quantified Objectives, Policies and Programs

By definition, a goal is an "...ideal future end, condition or state related to the public health, safety or general welfare toward which planning and planning implementation measures are directed... a goal is generally not quantifiable, time-dependent or suggestive of specific actions for its achievement" (State of California *General Plan Guidelines*, 1990). Thus, it is unlikely that the Town of Paradise can expect to completely achieve the goals set forth in the 1985 *Housing Element*. Nevertheless, the town has made progress toward its goals, as described in this section and below in the review of the 1985 *Housing Element* programs. The goals, which are consistent with state and national housing goals to provide a decent home and suitable living environment for every individual and family, have for the most part been incorporated unchanged into this *Housing Element* update due to their continuing worthiness as an expression of community values.

The *General Plan Guidelines* define a policy as a specific statement that guides decision making and which indicates a clear commitment of the local legislative body, the Town Council. A review of the policies contained in the 1985 *Housing Element* indicates that the town intends to support and uphold some of the adopted policies, which have been carried forward into the *Housing Element* Update (Volume I, *Policy Document*, Section 6, *Housing Element*), along with newly drafted policies.

An objective is defined as a "...specific end condition or state that is an intermediate step toward attaining a goal." With regard to the *Housing Element*, objectives must be *quantified*; that is, measurable and/or time-specific. The quantified objectives contained in the 1985 *Housing Element*, along with an estimate of the actual results achieved during the planning period, are presented in Table 12-16.

Previous Housing Element Programs

The results of the programs contained in the town's 1985 *Housing Element* are summarized and reviewed below on a program-by-program basis.



● 6.42 Building Sites and Densities

- *Allow residential and mixed development in commercial zones, particularly dwellings in upper stories.*

Residential uses are permitted in the C-B (Central-Business) zone and the C-C (Community-Commercial) zone with a use permit, to implement this program.

- *Encourage creation of new building sites through demolition of dilapidated units and assemblage of small parcels.*

The town has established a demolition permit process and has also included lot merger provisions in the recently-adopted subdivision ordinance to implement this program. In addition, the town is actively considering establishment of a redevelopment agency and preparation of a redevelopment plan, which would provide tools for assembling properties for this purpose.

- *Assist development of specific plans for residential densities, roads, drainage, utilities and sewage disposal in the largely undeveloped ridgetops along the southern and western edges of the town.*

The town has completed studies and established impact/road improvement development fees for the westside and southside areas, which will allow development to proceed in those areas, and help to implement this program. The 1992 *General Plan* revision, of which this *Housing Element* is a part, designates areas for development and addresses the issues outlined in this program.

● 6.43 Development and Construction

- *Continue to review innovations and cost saving materials and techniques that will provide the same quality construction at lower cost to the consumer.*

The building permit review process which implements this program is ongoing. The building division has reported moderate success in educating themselves and builders about innovations and cost saving materials and techniques. Due to lack of staff and budgetary constraints, full implementation has been delayed and success has been only moderate.

- *Require the first floors of the multi-family developments to accommodate access and use by the elderly and handicapped.*

This is currently required by the Town of Paradise, to implement this program.



- *Continue to analyze setback requirements, lot design criteria, review procedures, parking requirements, and street improvement standards and modify each of these where possible to cut development costs.*

This is an ongoing process in the Town of Paradise Community Development Department. Major revisions to the zoning ordinance were adopted in 1988 and 1992, and amendments to the subdivision ordinance were adopted in 1990 and 1993, which incorporated numerous changes in setback requirements, lot design criteria, review procedures, parking requirements, and street improvement standards.

- *Allow mobile homes in all residentially zoned areas of the town unless clearly incompatible with existing development.*

The zoning ordinance does not distinguish between conventional houses and mobile homes on permanent foundations within rural residential and single family residential zoning districts. In addition, the Paradise zoning ordinance includes a Mobile-Home combining zone which permits the use of mobile homes not placed on a permanent foundation as dwellings in the Rural Residential-3, Rural-Residential, Single-Family Residential, Multiple-Family Residential, Multiple-Family/Professional, Rural Residential-10 and Rural Residential-20 zones. Relative to other California cities and towns, there is a high percentage of mobile homes in Paradise (22.6 percent of the single-family housing stock).

- *Limit condominium conversions to assure sufficient housing opportunities for renters.*

The actions of the private market have limited the conversion of apartments to condominiums without the need for intervention by town government to implement this program. Very few conversion requests have ever been submitted to the Community Development Department.

● **6.45 Maintenance and Utilities**

- *Inspect housing upon complaints about health and safety problems and require compliance with applicable codes.*

Such inspections and compliance procedures are an ongoing function of the Town of Paradise building division to implement this program.

- *Initiate a program of periodic inspections of apartments and rest homes.*

Due to a lack of staffing and budgetary resources, the town does not yet have a program for performing periodic inspections of apartments and rest homes to determine compliance with applicable codes. Residential care facilities must be licensed by the state, and are periodically inspected by state officials as part of the licensing procedures.



- *Require demolition of vacant dilapidated dwellings which are not economically feasible to improve to code standards.*

The town adopted an ordinance (Chapter 15.06.010 of the Paradise Municipal Code) in 1989 to implement this program.

- *Require design of new residential development to minimize use of energy and water and to maximize use of natural lighting, heating, and cooling process.*

The Town of Paradise building division enforces building code requirements to implement this program.

- *Allow home occupations.*

The Town of Paradise permits home occupations with the securing of a home occupation permit in residential zones to implement this program.

- *Require developers to pay the costs of new facilities and services needed for new development.*

This is currently the practice of the Town of Paradise with regard to new facilities, although a recent management study has shown that not all costs are fully recovered by town fees. While there are additional mechanisms available to recoup the costs of increased services (such as AB 1600 fees and assessment districts), implementation of such fees would not advance the cause of increasing the supply of affordable housing in the town.

- **6.46 Residential Environments**

- *Encourage retention of adult trees or replacement with adequate sized trees on all new development sites.*

The town has adopted a tree ordinance to implement this program. This ordinance is further supported by the policies contained in the revised *Conservation Element* of the *General Plan*. Implementation of this program results in lower energy (cooling) costs for home occupants.

- **6.47 Housing Assistance Programs**

- *Assist development of a housing complex for the elderly, handicapped and disabled through the Butte County Housing Authority by helping the authority select and acquire a site and by placing a referendum on the ballot.*



Due to a lack of staff and budgetary resources, the town has been unable to implement this program. The hours of town staff were cut by ten percent in 1990 for budgetary reasons.

- *Support continuance and expansion of the Housing Authority's rental assistance program.*

The town provides informal support for this Housing Authority program.

- *Apply for CDBG funds (from HUD) to help finance a senior citizen's center, acquisition of new housing sites, rehabilitation loans, construction of public facilities, and other eligible activities.*

The Town of Paradise submitted a CDBG application under the small cities program in 1989 for a housing rehabilitation program within a target area. It is the town's understanding that this application was not competitive due to the town's relatively high median income (in comparison to Butte County), the relatively good condition of the housing stock, and perhaps also the lack of a comprehensive housing condition survey.

In 1989, the town initiated the process of evaluating its most serious community development needs which would be eligible for funding. The town determined that one of those needs was a rental housing survey. The town received a planning/technical assistance allocation under the CDBG program to fund the survey work, with the direction to prepare subsequent applications for state and federal funding to address needs that are identified in the survey report.

Private projects that the town has supported include the Heritage Convalescent Hospital, a 100-bed facility located on upper Skyway.

- *Support continuance of the Community Action Agency's weatherization program and other housing-related programs.*

The town provides informal support for Community Action Agency programs.

- *Encourage local developers and nonprofit sponsors to use HUD-FHA programs to assist construction of affordable housing, particularly for the elderly and those needing various levels of daily care.*

Due to lack of staff and budgetary resources, the town has been unable to devote the resources that would be required to implement this program.

- *Support continuance and local use of housing assistance programs provided by the California Department of Housing and Community Development.*

See response to third item in Section 6.47.



How the Updated Element Incorporates What Has Been Learned from the Previous Element

Several observations and conclusions can be drawn based on experience gained by the town in implementing the previous *Housing Element*. First, it is reasonable to conclude that the town has accomplished more in the quest for decent, affordable housing than if there had not been an adopted *Housing Element* during the planning period, simply by focusing attention on this issue. Secondly, it is fair to say that outside forces, both governmental and nongovernmental, play a large role in the town's relative success or failure at *Housing Element* implementation. This conclusion is particularly valid with regard to interest rates, availability of financing, the private real estate market, and the commitment of state and federal funds to housing programs. Third, it can also be concluded that, at the end of this planning period, the Town of Paradise, and the Butte County region of which it is a part, remains one of the more affordable areas in the state for housing.

With regard to program implementation, the town experienced its greatest difficulties in attempting to use, or encourage private developers to use, state and federal housing subsidy programs. Part of this can be attributed to a lack of interest on the part of private developers during a relatively healthy housing market, and to a reduced commitment on the part of state and federal government funding of such programs. The difficulties on the part of the town, however, can mostly be traced to a lack of staffing and budgetary resources to enable existing town staff to have the necessary time and expertise to devote to implementation of these programs and funding applications, many of which are quite complex. The entire planning division staff consists of three persons who are responsible for all current and long range planning activities.

There are unique physical characteristics of the Town of Paradise which also impact the provision of affordable housing. In addition to the higher costs associated with development in a foothill community, Paradise is the largest unsewered community in California, which limits high density residential development. These issues are discussed in more detail in Section 12.5 above.

This evaluation has been taken into consideration in the development of goals, quantified objectives, policies and programs of the updated *Housing Element*, as set forth in Volume I, *Policy Document*. Two programs are proposed that, when implemented, will have a considerable impact on housing affordability over the long term: construction of a community collection sewer system and establishment of a redevelopment agency. These programs are explained in the *Policy Document* referenced above.

Public Participation in the General Plan Revision Program

The revision of the housing element has proceeded in conjunction with the overall revision to the town's *General Plan*. The public participation process has included the formation of four citizen subcommittee groups utilizing approximately eighty citizens from all segments of the community, ranging from high school students to lawyers, painting contractors to retired corporate executives. The citizen subcommittee



groups have met routinely for two years, beginning in early 1991, brainstorming community issues, goals for the future and policies for reaching those goals.

Citizens have also had the opportunity to interact in the process during the regular meetings of the General Plan Revision Steering Committee. While these meetings are not public hearings, citizens have been encouraged to attend and discuss any aspect of the *General Plan* elements or revision program.

Town staff have also conducted an aggressive speaking tour throughout the community, discussing all elements and aspects of the General Plan revision program with various civic organizations, special districts and other interested groups. These speeches and workshops have provided a forum for many different groups in the Paradise community to voice their concerns and visions for the future.

Public comment on the draft *Housing Element* was solicited through Planning Commission and Town Council hearings and through the environmental review process for the element. Notices of these public hearings were published, distributed to interested community organizations representing special needs, and posted in governmental buildings. Town residents will have an opportunity to participate in the implementation of the *Housing Element*, as many of the implementation measures require the adoption of ordinances or other specific actions at Planning Commission and Town Council meetings.

Through the means above, the town believes it has actively sought and pursued public participation and public comments on all phases of the *Housing Element* revision, and has attempted to include all segments of the community in its public participation process.

Consistency with Other General Plan Elements

The *Housing Element* was prepared in conjunction with the revision of the other General Plan elements. Its strongest relationship is with both the land use and circulation elements, where land use categories and circulation patterns have been established to accommodate housing needs. In addition, it bonds with the discussions of public facilities and infrastructure, in that only those areas deemed suitable for residential development have been so designated.

The primary thrust of the revised Paradise *General Plan* is to ensure orderly growth and development according to the town's ability to provide adequate services and infrastructure, as well as to ensure long-term preservation of the environmental and rural charm of the town. While the *Housing Element* acknowledges the regional housing fair share numbers, and will attempt to meet them, it stays consistent with the primary thrust of the plan by listing factors that must come together in order for the needed housing to be constructed in the town.

TABLE 12-16
COMPARISON OF QUANTIFIED OBJECTIVES
1985 HOUSING ELEMENT
1985-1992

Objective	Total Dwelling Units/Year Projected	Total Dwelling Units/Year Achieved
Construction of new dwelling units	238	129
Rehabilitation of dwelling units	44	0
Demolition/Replacement of dwelling units	13	14

Source: Town of Paradise Building Department, 1985 Paradise Housing Element



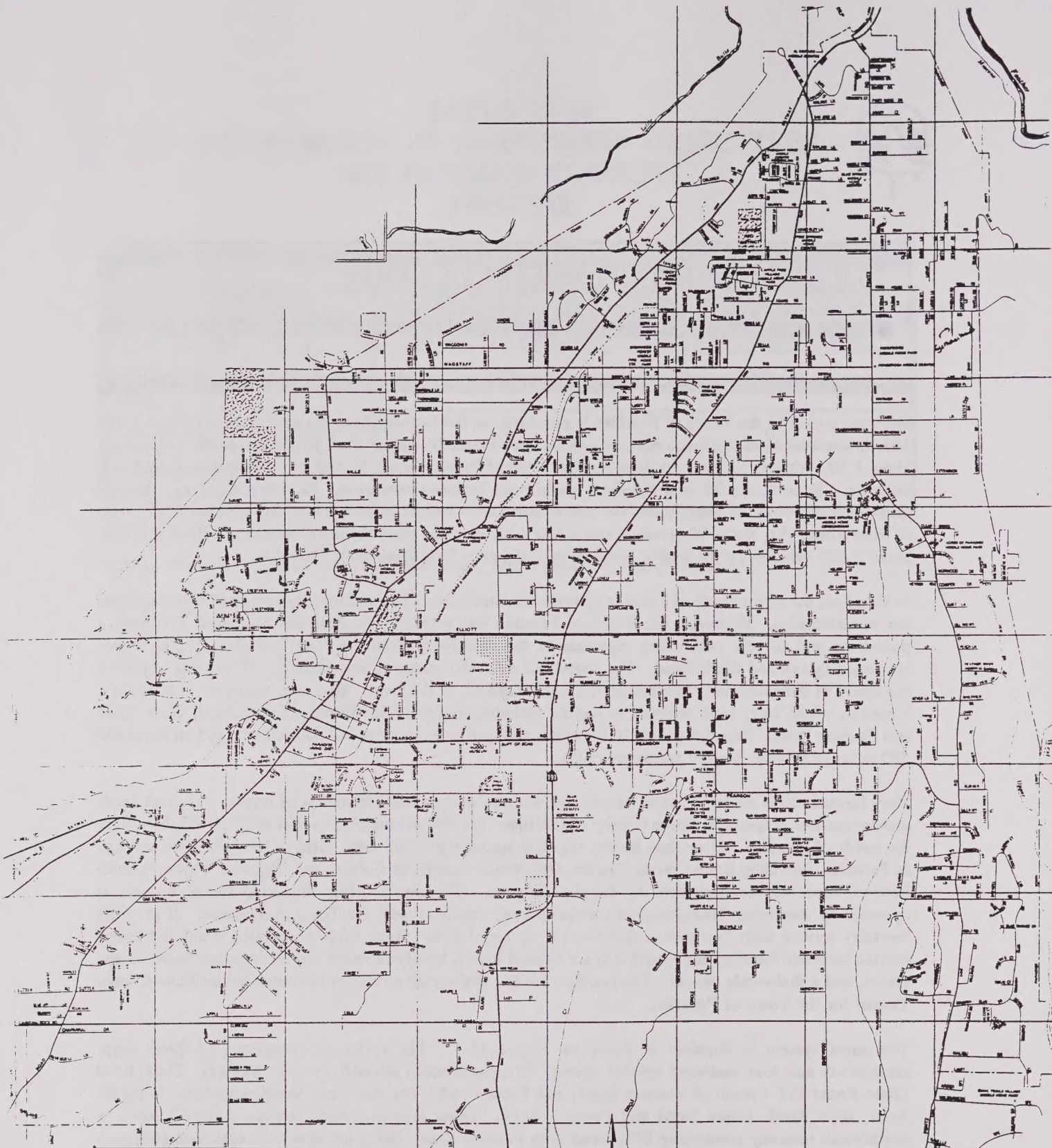
13.0 TRANSPORTATION/CIRCULATION

Regional access to the Town of Paradise is provided via the Skyway from the southwest and State Route 191, a two lane rural highway, northerly from State Route 70. Near State Route 70, Route 191 carries about 4,300 vehicles per day. In Paradise, just south of Pearson Road, State Route 191 carries about 8,600 vehicles. State Route 70 is a two-lane north/south highway connecting Sacramento, Marysville and Oroville to the south of State Route 191 and Chico and Red Bluff to the north of State Route 191. South of State Route 191, Route 70 carries about 7,100 vehicles while north toward Coal Canyon Road it carries about 3,400 vehicles (1989 *Traffic Volumes of California State Highways*, Caltrans).

In Paradise, the major mode of travel is by private automobile. The pedestrian system and bicycle systems are not extensive. However, the Town of Paradise has provided the Paradise Memorial Trailway, a pedestrian and bicycle path along segments of the abandoned Southern Pacific Railroad right-of-way between Skyway and Clark Road. The pedestrian sidewalk system is very limited. This is due in part to the desire of the community to maintain the rural character of the town. There are a number of roadways, however, which carry high volumes of traffic, including Elliott Road, Skyway, Pentz Road, Clark Road and Pearson Road. Paradise presently has about eighty-five miles of paved public roads and an estimated 280 miles of private, largely nonpaved roads.

Very limited use is made of public transit, rail or other non-automobile modes of travel. A transit needs assessment was prepared by Butte County and Caltrans in 1979 and updated in May of 1993 which outlines the needs of Paradise. More than twenty regional agencies provide some form of transportation services in Paradise, including Butte County Transit, Greyhound bus, Butte College bus, Paradise Unified School District, local taxi services and the Paradise Express. Paradise Express, the local transit service, is operated by American Transportation Company under contract with the Town of Paradise. It provides weekday service with four sedans and two lift-equipped vans. Butte County operates scheduled transit service between Paradise and Oroville (on a limited basis), hourly daytime service between Paradise and Chico, and a dial-a-ride system. The contract for this dial-a-ride service is administered by Butte County Transit for the Town of Paradise.

The street system in Paradise is shown on Figure 13-1. The system is comprised of three major north/south and four east/west arterial streets. The north/south arterials include: Skyway, Clark Road (State Route 191 - south of Pearson Road) and Pentz Road. The east/west facilities include: Wagstaff Road, Bille Road, Elliott Road and Pearson Road. Other arterial streets include: Sawmill Road, a north/south roadway connecting Bille Road with Pearson Road; Nunneley Road, an east/west collector, between Elliott Road and Pearson Road; and South, Middle and North Libby Roads; which are north/south facilities that intersect a number of the east/west streets in Paradise.



PARADISE STREET SYSTEM

FIGURE 13-1



13.1 STREET CLASSIFICATION SYSTEM

Paradise is a rural community; therefore, the street system does not include freeways or expressways. State Route 191 is designated by Caltrans as a "conventional (no access) control" facility, a highway with no control of access, which may or may not be divided or have grade separations at intersections. Within Paradise the street system is comprised of arterial, collector and local residential streets. Street classification is used to designate the various streets within a community including the design standards for the street, street width, number of travel lanes, access control and other features. Arterial streets are generally the wider streets and carry the major traffic volumes. Collector streets carry less traffic and provide connections between adjacent land uses and the arterial street system. Collector streets do not generally function as residential streets; however, collector streets can access residential land uses. In Paradise, many of the collector streets serve residential uses. Local streets normally serve isolated or smaller residential areas.

The 1982 *General Plan* does not specifically classify street types. A field reconnaissance was conducted in 1991 and the street system was observed in terms of traffic volume levels, roadway widths, access and relationship to adjacent land uses. These factors were used to provide a preliminary designation for the major and secondary streets in Paradise.

Arterial Streets

A class of street serving a major movement of traffic not served by a freeway or expressway. In addition, arterials tend to accommodate through traffic such as trips between Paradise Pines and Chico or Paradise Pines and Butte College. In Paradise the following streets operate as arterial roadways:

North/South Arterials

Skyway
Clark Road
Pentz Road

East/West Arterials

Wagstaff Road
Bille Road
Elliott Road
Pearson Road

Collector Streets

Surface streets providing land access and traffic circulation service for residential, commercial and industrial areas. In Paradise the following streets operate as collector roadways:



North/South Collectors

Moore Road
Rocky Lane
Oliver Road
Graham Road
Lucky John Road
Berkshire Avenue
Oak Way
Forest Lane
Maxwell Drive
North Libby Road
Sawmill Road
Kibler Road
Foster Road
Scottwood Road
Academy Drive
Edgewood Lane
Almond Street
Copeland Road (Elliott to
Nunneley Road)
Neal Road
South Libby Road

East/West Collectors

Dean Road
Merrill Road
Stark Lane
Valley View Drive
Central Park Drive
Young Avenue (Partial)
Honey Run Road
Nunneley Road
Fir Street
Birch Street
Buschmann Road
Wayland Road
Stearns Road

Local Streets

Surface streets providing land access and traffic circulation service within residential areas. The remaining streets within Paradise, non-arterial and collector streets, could be designated as local streets. In Paradise, there are many streets which are private or do not provide linkages with adjacent collector or arterial streets. Numerous streets have been allowed to be constructed which do not provide connectivity within the street system.

The Arterial System

The Town of Paradise has seven major arterials. Each of these facilities is discussed below. Consideration is given to describing the number of travel lanes, signalization, adjacent land uses and levels of service. Average daily traffic volumes have been measured along numerous segments of the street system. Butte County compiled counts from 1955 until 1977. The Town of Paradise counted an extensive number of local intersections during 1989 as part of the development by Butte County of the Paradise traffic model. Table 13-1 indicates the average daily traffic volumes on the major streets in Paradise. Table 13-1 also includes historical data along many of the local streets.



- **Clark Road (State Road 191).** Clark Road is a four-lane roadway with a central two-way left turn lane from Pearson Road to Wagstaff Road. Clark Road carries between 9,000 and 25,000 daily trips. North of Wagstaff Road, Clark Road is two lanes carrying about 17,000 trips with stop sign controls at most local intersections. Clark Road intersects Skyway at its northern terminus. Clark Road at Skyway is stop sign controlled with the movements along Clark Road controlled.

Many of the intersections along Clark Road are signalized with left turn lanes. No onstreet parking is allowed along most of the length of Clark Road. The major intersections along Clark Road include: Pearson Road, Elliott Road, Bille Road, Wagstaff and Skyway. Local collector intersections are provided at Buschmann Road, Nunneley Road, and Central Park Drive.

Between 1982 and 1989 traffic volumes along Clark Road have doubled. Generally, the growth has occurred north of Pearson Road. However, traffic levels have also increased markedly to the south of Pearson Road. The intersections along Clark Road operate at generally acceptable levels of service during peak hours.

- **Skyway.** Skyway is a four-lane roadway with a central two-way left turn lane from Pearson Road to Wagstaff Road and carries between 11,000 and 21,000 daily trips. North of Wagstaff Road, Skyway is two lanes with stop sign controls at most local intersections. Many of the major intersections along Skyway are signalized with left turn lanes. The significant intersections along Skyway include: Neal Road, Pearson Road, Elliott Road, Oliver Road, Maxwell Drive, Bille Road, Wagstaff Road, Rocky Lane, Clark Road and Pentz Road.

Between 1982 and 1989 traffic volumes along Skyway have increased substantially. Generally, the growth has occurred the entire length of Skyway. The intersections along Skyway between Elliott Road and Bille Road operate at generally acceptable levels of service during peak hours. South of Elliott Road and north of Bille Road peak hour levels of service are worse. Peak hour conditions at Clark Road and Wagstaff in the north and at Honey Run Road and Neal Road in the south are at or approaching unacceptable levels.

- **Pentz Road.** Pentz Road is a two-lane arterial which extends from the southern town limits to Skyway. Pentz Road carries about 7,000 trips per day. Most of the intersections along Pentz Road are stop sign controlled, with the stop control on the streets intersecting with Pentz Road. The intersections of Wagstaff Road and Pentz Road and Bille Road and Pentz Road are all-stop. Traffic volumes along Pentz Road have increased about fifty percent since 1982. The levels of service along Pentz Road are acceptable.
- **Pearson Road.** Pearson Road is the most southerly arterial in Paradise and carries about 1,000 daily trips. It extends from Skyway to Pentz Road. Between Skyway and Clark Road it is a four-lane facility. Stop sign controls are provided at many intersections with four-way stops at Black Olive Drive and Recreation Drive. East of Clark Road, Pearson Road is a two-lane facility. Pearson Road is the last roadway in the southern portion of the town that provides continuous



east/west access between Pentz Road and Skyway. South of Pearson Road, many of the residential areas must use north/south arterial and collector streets to access Pearson Road.

- **Remaining Arterial Streets.** The remaining arterial streets are all two-lane facilities with traffic controls at most of the north/south arterial intersections. Bille Road and Wagstaff Road provide continuous east/west connections between Skyway and Pentz Road. Elliott Road provides connections between the area west of Skyway and just east of Sawmill Road. Nunneley Road extends east/west from Academy Drive (on the west) to Oak Creek Drive (on the east).

The Collector System

There are many collector streets in Paradise. The designation of collector and local street can be misleading when used in Paradise. Collector streets tend to provide the linkages between segments of the arterial street system while local streets serve immediate residential or other isolated land uses. Using this concept, the connection of Forest Service Road and Moore Road provides a collector linkage between Skyway and Clark Road north of Wagstaff Road. Within the Town of Paradise roadway system, there are some missing linkages in the collector street system. These include:

- The connection of Young Avenue to Bille Road over public streets.
- The easterly extension of Elliott Road to Kibler Road.
- The westerly extension of Buschmann Road to Skyway.
- The westerly extension of Anchor Way to Clark Road at Noffsinger Lane or alternative intersection.
- The connection of South Libby Road and Edgewood Lane.
- The connection of Pinewood Drive and Honey Run Road.

Other similar situations may occur elsewhere in Paradise. New collector road connections, and the standard of design they should provide, need to be identified. The levels of service within the collector street system are acceptable. There are some locations where stop sign controls and pedestrian facilities may be warranted (e.g., along Maxwell Road near the high school).

The Local Street System

The local street system is composed of numerous public and private roadways throughout Paradise. The system appears to be based upon individual infill developments and subdivision activities rather than a comprehensive townwide circulation plan. Most streets serve a limited number of land uses, primarily residential. Further, the street standards vary substantially from area to area. The minimum allowable street width appears to be sixteen feet established in the 1982 *General Plan* for fire access. The minimum street width standard is twenty feet.



As traffic grows in Paradise, the potential for increased concentrations of traffic along existing collector and arterial streets will grow as well. Without an improved collector and local street system of interlinked roadways, the potential for required widening of the existing collector and local street system to be required will increase.

Table 1.1: Traffic Volume Data		
Year	Volume	Volume
1990	1,000	1,000
1995	1,200	1,200
2000	1,400	1,400
2005	1,600	1,600
2010	1,800	1,800
2015	2,000	2,000
2020	2,200	2,200
2025	2,400	2,400
2030	2,600	2,600
2035	2,800	2,800
2040	3,000	3,000
2045	3,200	3,200
2050	3,400	3,400
2055	3,600	3,600
2060	3,800	3,800
2065	4,000	4,000
2070	4,200	4,200
2075	4,400	4,400
2080	4,600	4,600
2085	4,800	4,800
2090	5,000	5,000
2095	5,200	5,200
2100	5,400	5,400

TABLE 13-1
AVERAGE DAILY TRAFFIC VOLUMES¹

Roadway Segment	1982 Traffic Volumes	1989 Traffic Volumes
Skyway		
North of Wagstaff	7,000	11,000
Bille to Wagstaff	13,000	15,900
Elliott to Bille	17,200	20,700
Pearson to Elliott	17,600	17,700
South of Neal	10,800	17,600
Clark Road (SR191)		
North of Wagstaff	5,700	9,300
Bille to Wagstaff	8,900	17,700
Elliott to Bille	11,800	24,700
Pearson to Elliott	11,200	22,100
South of Pearson	6,700	8,600
Pentz Road		
North of Bille	4,900	7,375
South of Stearns	4,800	6,375
Wagstaff Road		
Skyway to Clark	8,200	7,700
Clark to Pentz	4,500	5,550
Bille Road		
Skyway to Clark	NA	10,600
Clark to Pentz	NA	11,000



Roadway Segment	1982 Traffic Volumes	1989 Traffic Volumes
Elliott Road		
Skyway to Maxwell	6,800	19,800
Clark to Pentz	3,200	9,600
Pearson Road		
Skyway to Clark	10,800	10,900

- ¹ 1982 traffic data from the Town of Paradise, traffic safety study, September 1982. The 1989 counts provided to the Town of Paradise by Butte County except State Route 191 south of Pearson Road which was provided by Caltrans District 3. Some counts were factored at eight percent from peak hour to daily estimates.



13.2 EXISTING LEVELS OF SERVICE

Level of service is determined differently for signalized and unsignalized intersections. For signalized intersections, a percentage of capacity is calculated which results in a specific overall intersection level of service. For unsignalized intersections, an amount of reserved capacity for each movement is calculated. The lowest amount of reserved capacity is used to determine the intersection level of service. It should be noted that for unsignalized intersections, some movements may experience acceptable levels of service while others may not. For this assessment, the level of service for the worst case traffic movement on each approach is shown. For example, a level of service shown as "A/A/D/E" would mean that the level of service for the north and southbound approaches is "A" while the level of service for the eastbound approach is "D" and the westbound approach "E."

The level of service (LOS) rating system of LOS A through LOS F is used to indicate the average level of traffic utilization of an intersection. LOS A indicates little or no congestion and LOS F indicates severe congestion. The 1982 *General Plan* does not appear to establish a specific standard for acceptable level of service. In general, most rural communities use level of service "C" for a standard. Table 13-2 describes the various level of service categories and intersection performance characteristics for signalized intersections. For the unsignalized intersections, the 1985 Highway Capacity Manual was used to determine level of service (Table 13-3). The Butte County Congestion Management Program has adopted a level of service (LOS) standard "D" for the principal arterial road system in Paradise.

Using the existing peak hour data provided by the Town of Paradise, the existing peak hour levels of service were determined at a number of intersections. Table 13-4 details the peak hour levels of service. For the unsignalized intersections, the level of service by approach together with the reserved capacity for the worst case traffic movement are noted. For consistency, the order of the results is northbound, southbound, eastbound and westbound. In other words, a LOS result shown in the various tables within this report noted as "A/A/B/B" would mean LOS "A" for the northbound and southbound approaches and LOS "B" for the eastbound and westbound approaches. Further, a "-" is used when a particular approach and/or left turn movement does not exist. For example, a "T" intersection such as Skyway and Clark Road would show the existing worst case level of service of "D" and the various approach levels of service as "A/A/-/D."

Level of Service Evaluation

Most of the intersections in Paradise operate at acceptable levels of service. Of the twenty-eight intersections evaluated, twelve were signalized and sixteen unsignalized. The results of the LOS analysis are discussed below.



Along Skyway, the signalized intersections at Wagstaff Road and Pearson Road operate at LOS "D" and "C" respectively. All of the signalized intersections along Clark Road operate at LOS "B" or better.

For the unsignalized locations, many of the intersections operate at unacceptable levels of service. Specifically, Skyway at Clark Road operates at LOS "D." Skyway at Honey Run Road and Neal Road both operate LOS "E." Pearson Road at Scottwood Road operates at LOS "D" while Elliott Road at Maxwell Drive operates at LOS "E." The remaining intersections operate at LOS "C" or better. The locations that operate at LOS "C" include: Skyway at Pentz Road, Clark Road at Buschmann Road, Pentz Road at Wagstaff Road, and Sawmill Road at Pearson Road.

TABLE 13-2
LOS CRITERIA SIGNALIZED INTERSECTIONS

Level of Service	Vehicle Delay (seconds)	Volume to Capacity Ratio	Description
A	≤ 5.00	0.00 - 0.59	Free Flow/Insignificant Delays: No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication.
B	5.1 - 15.0	0.60 - 0.69	Stable Operation/Minimal Delays: An occasional approach phase is fully utilized. Many drivers begin to feel somewhat restricted within platoons of vehicles.
C	15.1 - 25.1	0.70 - 0.79	Stable Operation/Acceptable Delays: Major approach phases fully utilized. Most drivers feel somewhat restricted.
D	25.1 - 40.0	0.80 - 0.89	Approaching Unstable/Tolerable Delays: Drivers may have to wait through more than one red signal indication. Queues may develop but dissipate rapidly, without excessive delays.
E	40.1 - 60.0	0.90 - 0.99	Unstable Operation/Significant Delays: Volumes at or near capacity. Vehicles may wait through several signal cycles. Long queues form upstream from intersection.
F	≥ 60	N/A	Forced Flow/Excessive Delays: Represents jammed conditions. Intersection operated below capacity with low volumes. Queues may block upstream intersections.

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report No. 209, Washington, D.C., 1985.

TABLE 13-3
LOS CRITERIA UNSIGNALIZED INTERSECTIONS

Level of Service	Expected Delay	Reserve Capacity (Vehicles/Hour)
A	Little or no delay	≥ 400
B	Short traffic delays	300 - 399
C	Average traffic delays	200 - 299
D	Long traffic delays	100 - 199
E	Very long traffic delays	0 - 99
F	Extreme delays potentially affecting other traffic movements in the intersection	≤ 0

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report No. 209, Washington D.C., 1985.

TABLE 13-4
PEAK HOUR LEVEL OF SERVICE¹

Intersection	Reserved Capacity (Critical Movement) or Volume Capacity Ratio (Percentage of Capacity)	PM Peak Hour Level of Service
Skyway at		
Pentz Road	245 Vehicles	A/A/B/C
Clark Road	158 Vehicles	A/A/-/D
Rocky Lane	423 Vehicles	A/A/-/A
Wagstaff Road	Not Applicable	D
Bille Road	0.52	A
Maxwell Drive	0.45	A
Oliver Road	0.48	A
Elliott Road	0.62	B
Honey Run Road	57 Vehicles	A/A/E/D
Pearson Road	0.71	C
Neal Road	2 Vehicles	A/A/E/E
Clark Road at		
Wagstaff Road	0.39	A
Bille Road	0.51	A
Central Park	0.39	A
Elliott Road	0.67	B
Nunneley Road	0.43	A
Pearson Road	0.59	A
Buschmann Road	250 Vehicles	A/A/C/-

Intersection	Reserved Capacity (Critical Movement) or Volume Capacity Ratio (Percentage of Capacity)	PM Peak Hour Level of Service
Pentz Road at		
Wagstaff Road	255 Vehicles	A/A/C/A
Bille Road	353 Vehicles	A/A/B/-
Pearson Road	372 Vehicles	A/A/B/-
Stearns Road	499 Vehicles	A/A/A/A
Pearson Road at		
Scottwood Road	169 Vehicles	D/D/A/A
Elliott Road at		
Maxwell Drive	98 Vehicles	B/E/A/A
Sawmill Road at		
Bille Road	306 Vehicles	B/B/A/A
Elliott Road	451 Vehicles	A/A/A/A
Nunneley Road	528 Vehicles	A/A/A/A
Pearson Road	238 Vehicles	B/C/A/A

¹ Applies Transportation Research Board Circular 212 Planning Method for Signalized Intersections and 1985 Highway Capacity Manual Unsignalized Methodology for all Stop Sign Controlled Intersections.

Source: Dowling Associates, 1991.



13.3 PARKING

As part of the 1982 *General Plan*, a parking inventory was conducted. The general policy since 1982 has been to restrict parking to offstreet areas and not develop additional onstreet parking spaces. As part of the current General Plan, the town's current offstreet parking standards will be reviewed and warranted changes to these standards will be recommended.

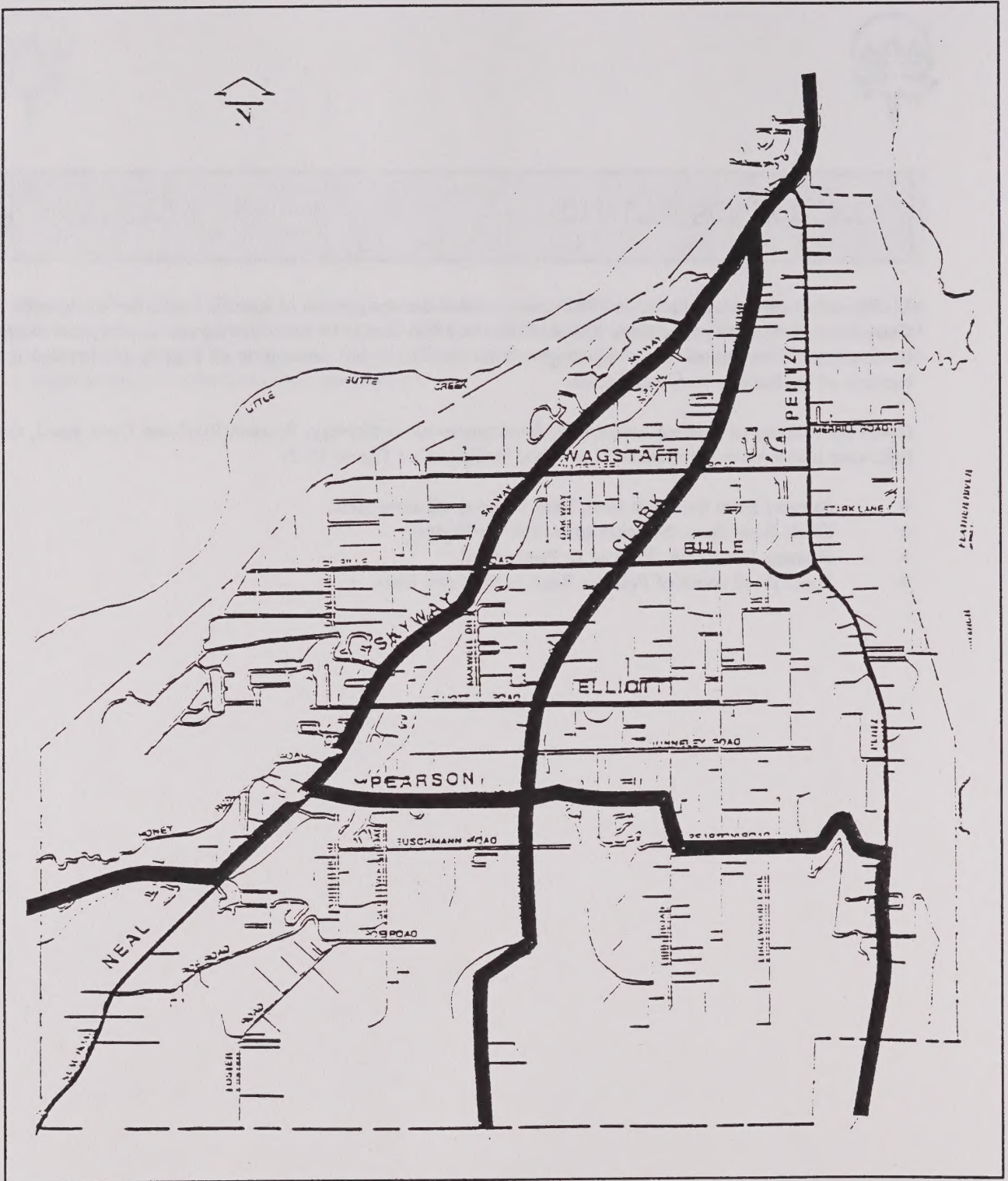


13.4 TRUCK ROUTES

Traffic safety studies conducted in 1982 recommended the designation of specific routes for truck traffic. Consideration of appropriate truck routes within Paradise should be based on several factors, including: the location of businesses served by large trucks, the origin and destination of logging trucks, and the location of exclusively residential areas.

Given the location of existing commercial development along Skyway, Pearson Road and Clark Road, the following routes were recommended as truck facilities (see Figure 13-2).

- Skyway from the south town limit to the north town limit.
- Clark Road from the south town limit to Skyway.
- Pearson Road from Skyway to Pentz Road.
- Pentz Road south of Pearson Road to the town limit.



PARADISE TRUCK ROUTES

FIGURE 13-2



13.5 THE PARADISE AREA TRANSPORTATION PLANNING MODEL

Butte County, with the assistance of a professional traffic consulting firm, has recently completed a traffic model for the Paradise area. The model was calibrated to 1989 conditions and includes the Town of Paradise, the communities of Magalia and Paradise Pines and the area south of Paradise to Route 70. External traffic zones include Chico, Route 99 south, Route 70 south and Route 70 east from Pentz Road. The model was reviewed for use during the *General Plan* to evaluate future land use conditions. In general, the model appears to be adequately calibrated for application in the *General Plan* process. To date, three land use conditions have been modelled and analyzed. These include: the existing conditions, a five-year build out of the study area and a twenty-year build out of the study area. The build out land use intensities assumed that no major expansion of the existing sewage disposal system would occur. Therefore, the growth in single and multiple family dwelling units for the five-year period was restricted to 2,371 units. The twenty-year growth scenario provided 1,259 additional units. The existing conditions include about 14,750 single family and 777 multiple family units. Further, 3,681,600 square feet of nonresidential land use was included in the model.



14.0 PUBLIC SERVICES AND UTILITIES

14.1 LAW ENFORCEMENT

The Paradise Police Department has provided law enforcement for the Town of Paradise since 1980, when it took over law enforcement responsibility for the area from the Butte County Sheriff's Department. The police station is located at 5595 Black Olive Drive, adjacent to the main fire station. Dispatching of police, fire and ambulance units is done by the town. The department maintains a mutual aid agreement with the Sheriff's Department. As of March 1991, there were twenty-two sworn personnel and one reserve officer who patrol two beats. The current ratio of sworn personnel to population is one of the lowest in the state (approximately one officer per 1,200 citizens). According to the state Department of Justice, the statewide average in 1989 was approximately one officer for 500 citizens, while the City of Chico maintains one officer for approximately 650 citizens. The department's typical response time for routine calls is four to five minutes.

Although the town's higher percentage of senior citizens contributes to a lower than average crime rate, the absolute number of calls and residents' expectations of service are relatively high. The manufacture and sale of narcotics poses a problem due to the town's remoteness and the difficulty of observing individual properties because of the hilly and forested terrain.

Law enforcement in the unincorporated area surrounding the town is the responsibility of the Butte County Sheriff's Department, and is provided out of a substation in Paradise Pines. Coroner's service is provided throughout the county by the Sheriff's Department. The California Highway Patrol polices State Highway 191 out of their Chico and Oroville substations.



14.2 FIRE PROTECTION

The Paradise Fire Department provides fire protection and emergency services within the town limits and has a mutual aid agreement with the Butte County Fire Department. The department's service area includes all lands within the town limits. Upon incorporation of the Town of Paradise, the Paradise Fire Protection District was dissolved.

The department presently operates out of three fire stations, each with a designated response zone. Station 1 is located at 767 Birch Street, adjacent to the police station. The other two stations are located at the intersection of Wagstaff Road and Harvey Road, and at the intersection of Pearson Road/Newland Road and South Libby Road. As of March 1991, the department has twenty-seven authorized positions and twenty-one volunteers. The Police Chief is currently the acting Fire Chief, and has assumed the position of town Public Services Director. The department's average response time is two to two-and-one-half minutes.

The town Police Department dispatches ambulances and fire units in response to medical emergencies. Ambulance service is provided by Paradise Ambulance Service, a private service supervised by the Feather River Hospital Emergency Room. Both the ambulance and the fire units are staffed by paramedics.

The Town Council has considered contracting with the California Department of Forestry and Fire Protection (CDF) for fire protection services, rather than operating its own department, as a cost-saving measure. Fire Department employees would have become CDF employees if the Council had approved the contract arrangement. However, the Council has decided to maintain the Fire Department at this time.

Fire hydrants are owned by the town and maintained by the Paradise Irrigation District. Butte County, which contracts with CDF, provides fire protection services in the unincorporated portions of the study area. The county operates two fire stations in the study area, one in the Town of Paradise and one in Magalia.

Wildland Fire Potential and High Fire Risk Areas

Large areas within the Town of Paradise, as well as the secondary and tertiary study area, are subject to wildland fire potential. Typically, such areas pose a substantial fire risk to dwellings and other structures, as evidenced by the recent 49er fire in Placer and Nevada Counties, and the even more recent Oakland Hills disaster. Clearly, such areas pose great risk when people choose to live in them in large numbers. Despite this risk, such areas are typically viewed as attractive places to reside. It is important that fire risk and planning for fire safety play an important role when considering residential development in such areas. The *Multihazard Disaster Plan* has identified areas of particular concern for wildland fire:



- Country Club Drive
- West side of lower Skyway
- Butte Creek Canyon
- West Branch Canyon
- Nance Canyon
- Hamlin Canyon
- Berry Creek Canyon
- Little Clear Creek Canyon
- Clear Creek Canyon
- Horse Thief Canyon
- Dry Creek Canyon

Fire hazard severity zones have been mapped for the state responsibility area (SRA) around the Town of Paradise (see Figure 14-1). All of the secondary study area, and most of the tertiary study area, are within areas rated "high" or "very high." Fire hazard severity zones are intended to show relatively homogeneous areas and are based on fuel loading, slope, fire weather and other factors. The state Board of Forestry has adopted fire safety regulations which apply to the SRA and which require certain minimum fire safety measures within these areas. Outside the SRA, risks are more typical in nature and do not pose any unusual constraints to development, assuming that adequate fire service is in place and that standards for development take fire safety into consideration.

According to the *Paradise Multihazard Disaster Plan*, the possibility of major urban fires exists primarily within the built up areas of the downtown commercial areas of Paradise. This would pose major problems in the event that evacuation is necessary. All of these structures present a variety in type of construction, occupant load and fire potential.

Peakload Water Supply Requirements

In order to have effective fire suppression capability, it is necessary to have an adequate and reliable supply of water. As shown on Figure 14-3, the Town of Paradise and all but the most northerly portion of the secondary study area are served by one of the water districts or companies described in Section 14.8 below. Generally speaking, these systems have adequate line size and hydrants for fire suppression purposes; however, fire flow quantity may vary considerably from area to area, depending on the immediate water main size. The town's Fire Department has identified various fire flow deficiencies in the community. Water must be pumped to portions of the service area at higher elevations. The capital improvement program for the Paradise Irrigation District includes an accelerated pipeline replacement program to correct existing inadequacies, as described in Section 14.8 below.

According to the *Paradise Multihazard Disaster Plan*, municipal water systems are able to support large fire flows in the commercial areas, but not in the wildlands. The town is served by a forty-two inch PID water main. If ruptured, the town has approximately a one-day reserve; however, drought conditions would seriously disrupt these capabilities.



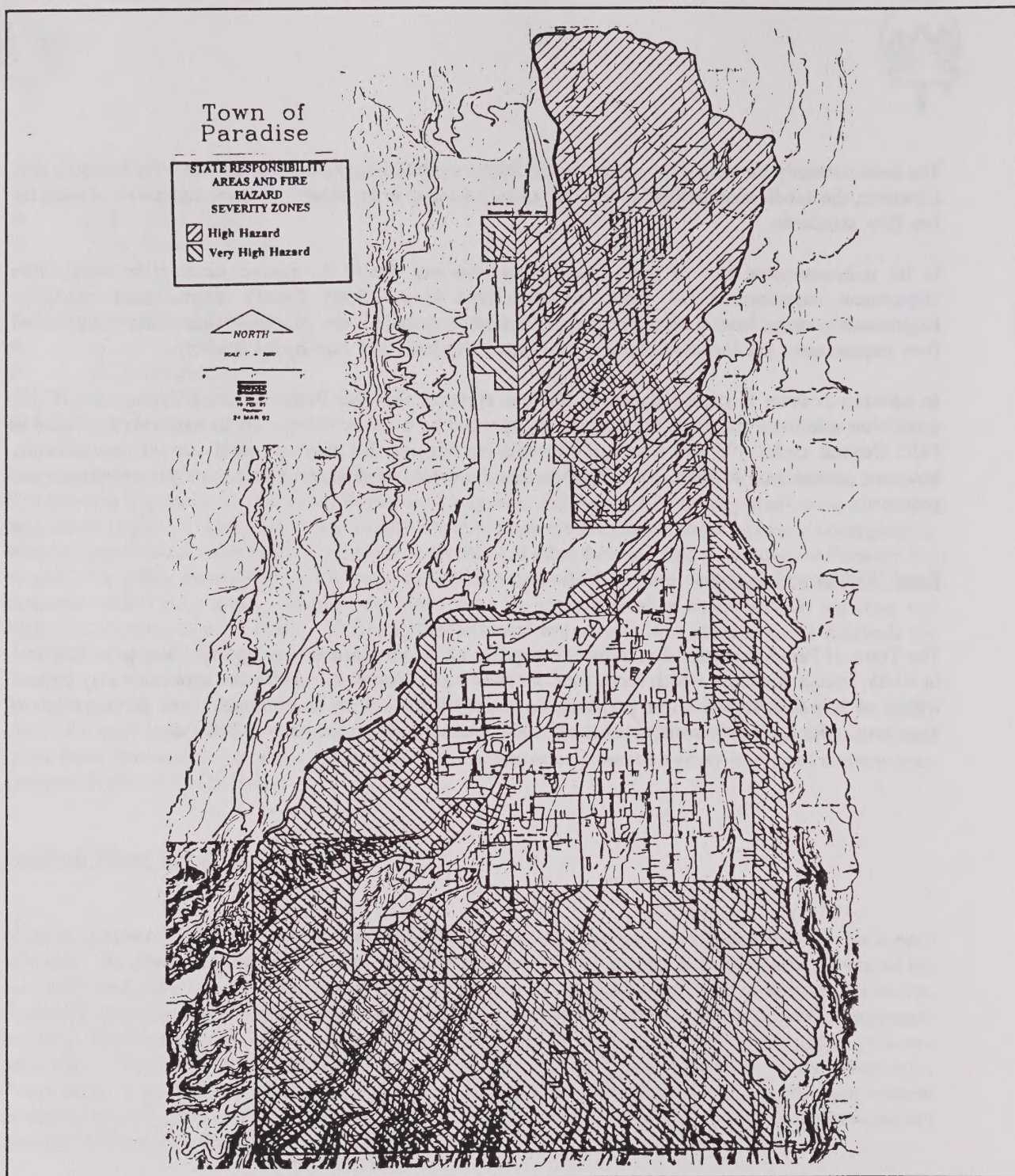
The town currently requires that each lot or unit within a subdivision have adequate water for domestic use. However, the subdivision ordinance does not require hookup to an existing system, and does not establish fire flow standards.

In the unincorporated area of Butte County, the type and size of the project dictates the county Fire Department requirements for water, as established in the Butte County improvement standards. Requirements range from a pressurized water system to a static water supply system. The county's fire flow requirements are included in the improvement standards and vary by lot density.

In addition to town or county standards for new systems, the state Public Utilities Commission (PUC) establishes minimum standards for systems not operated by a public entity. These standards are found in PUC General Order 103 and also apply to existing systems that may not meet current requirements; however, compliance is only required when new hookups, modifications or extensions of systems are proposed.

Road Widths and Access

The Town of Paradise subdivision ordinance requires all access easements or rights-of-way to be fifty feet in width, except for those which serve four or fewer lots. However, subdivision applicants may request widths of less than fifty feet for privately maintained roads. They must connect, via private roads if necessary, with a publicly-maintained street. Maximum cul-de-sac length is 1,800 feet.



STATE RESPONSIBILITY AREAS AND HAZARD SEVERITY ZONES

FIGURE 14-1



14.3 SOLID WASTE DISPOSAL

Solid waste collection and disposal in the Town of Paradise is provided by four independent haulers and is not mandatory. Recycling services are provided through various sources, both by private commercial haulers, nonprofit organizations and independent for profit recyclers. Yard waste is commonly disposed of by burning, and some residents dispose of their own refuse by hauling it to the landfill on an individual basis. Paradise generates approximately 30,398 tons per year of residential and industrial waste (Preliminary Draft *Source Reduction and Recycling Elements*, 1991).

The Neal Road Landfill, the only landfill for disposal of municipal waste in Butte County, is located on the north side of Neal Road, within the tertiary study area, and is operated by the Neal Road Landfill Company. It is a Class 3 landfill (no hazardous materials) and is anticipated to reach capacity by mid 1999. A new county disposal facility will need to be developed to meet the disposal needs of the county. The City of Chico has the only permitted composting facility in the Butte County area, and the cities of Chico and Oroville have significant recycling operations including redemption and drop off centers, commercial collection and wood waste processors.

AB 939, the Solid Waste Management Act of 1989, established the requirement for every city and county in the state to develop comprehensive plans for the implementation of programs and policies to reduce, recycle or otherwise divert from landfill disposal twenty-five percent of the solid waste stream by 1995 and fifty percent by 2000. These plans include the city and county *Source Reduction and Recycling Elements* and *Household Hazardous Waste Elements* as well as a countywide *Siting Element*. All of these elements are to be incorporated into a countywide *Integrated Waste Management Plan* by January 1, 1994.

The town is currently considering revisions to its solid waste management ordinances that would establish a town-wide roadside (curbside) recycling program, a chipping/composting program and mandatory solid waste collection for the residential, commercial and industrial sectors. The *Source Reduction and Recycling Elements* call for the establishment of a centralized permitted composting facility to be developed in Butte County by 1995. The actual siting for this proposed facility is not yet determined. The *Household Hazardous Waste Element* calls for the development of a household hazardous waste drop off center within three years. A permanent household hazardous waste collection facility is proposed to be developed by Paradise Solid Waste Systems, Inc., a private local company, at their facility to serve the needs of the town.



14.4 UTILITIES

Pacific Gas and Electric Company provides electricity in the study area and natural gas within the town and some outlying areas. Two high voltage electrical transmission lines cross the tertiary study area, near Highway 99. Electrical energy comes from a variety of sources and Pacific Gas and Electric Company foresees no problems in meeting future demand. Telephone service is provided to the study area by Pacific Bell. Propane is utilized for heating in some areas outside the town limits.



14.5 HEALTH SERVICES

The Town of Paradise is well-served with doctors, other medical practitioners and facilities. Feather River Hospital, a private hospital, is the largest employer in the Town of Paradise. It provides general acute-care service in a 109-bed facility located at 5974 Pentz Road. The hospital offers cardiopulmonary services, intensive coronary care, maternity care, surgical services and twenty-four hour emergency treatment. In addition, the hospital's discharge planning and social services department provides senior and support services for patients. Hospital expansion plans include the obstetrical unit, enlarging the operating room and additional beds for outpatient services.

Other facilities offering treatment in the Paradise area include:

- Alcohol and Chemical Recovery Program
- Feather River Home Health Agency
- Feather River Physical Rehabilitation Center
- Paradise Mammography Center
- New West Dialysis Clinic
- Paradise Adult Day Care
- Alzheimers Disease Center

There are three skilled nursing facilities located in Paradise and over fifty residential care facilities.

Residents typically travel to Chico and elsewhere for certain specialized services including severe burns, heart surgery, neurological treatment, severe trauma and psychiatric care.



14.6 SCHOOLS

The Paradise Unified School District (PUSD) provides public elementary and secondary education within the Town of Paradise, north to the Tehama and Plumas County boundaries, and within the secondary study area boundaries (please refer to Figure 14-2). The tertiary study area is served by the Chico Unified School District and the Durham Unified School District.

PUSD operates four elementary schools, one intermediate school, and two high schools. Two of the elementary schools (Paradise Elementary and Ponderosa Elementary), Paradise Intermediate and Paradise High School are located within the Town of Paradise. According to a *Site Selection Study* for a new elementary school prepared for PUSD in October 1989, enrollment at each of the elementary schools, with the exception of Brakebill Elementary (located in Stirling City), exceeded capacity. A more recent study, *Facility Needs and Funding Analysis* (March 1991), indicates that Pines Elementary is at capacity (see Table 14-1). With Paradise Elementary on year-round education (YRE), its capacity exceeds its current enrollment. Enrollment exceeds capacity at Paradise Intermediate School, but additional capacity exists at Paradise High School.

As stated in the *Site Selection Study*, "The rate of enrollment and the net increase in number of students has increased district-wide through the late 1980s. For grades K-6, enrollment has increased at an average annual rate of 5.87 percent from 1985-89. This growth rate is likely to continue through the 1990s." The study further states that "...enrollment is roughly proportional by grade, however, there is a slightly higher percentage of students in elementary school and most notably in kindergarten," which implies that the growth trend will continue. Please refer to Table 14-2 for district enrollment, 1978-79 through 1990. The 1991 study reports that the district has been experiencing enrollment growth of approximately 3.5 percent annually; however, as is indicated in the table, the actual change varies from year to year. Although some years have shown decreases, the average rate of increase from 1986-87 through 1990-91 was 3.29 percent.

One of the two elementary schools located in the town, Paradise Elementary, currently operates on a year-round schedule, and Ponderosa Elementary is proposed for a year-round schedule in 1991-92. The district owns another school site in the Upper Ridge, and plans to build a new school as soon as possible (probably a middle school). The district collects developer impact fees from building permit applications to apply to land acquisition and new construction costs.



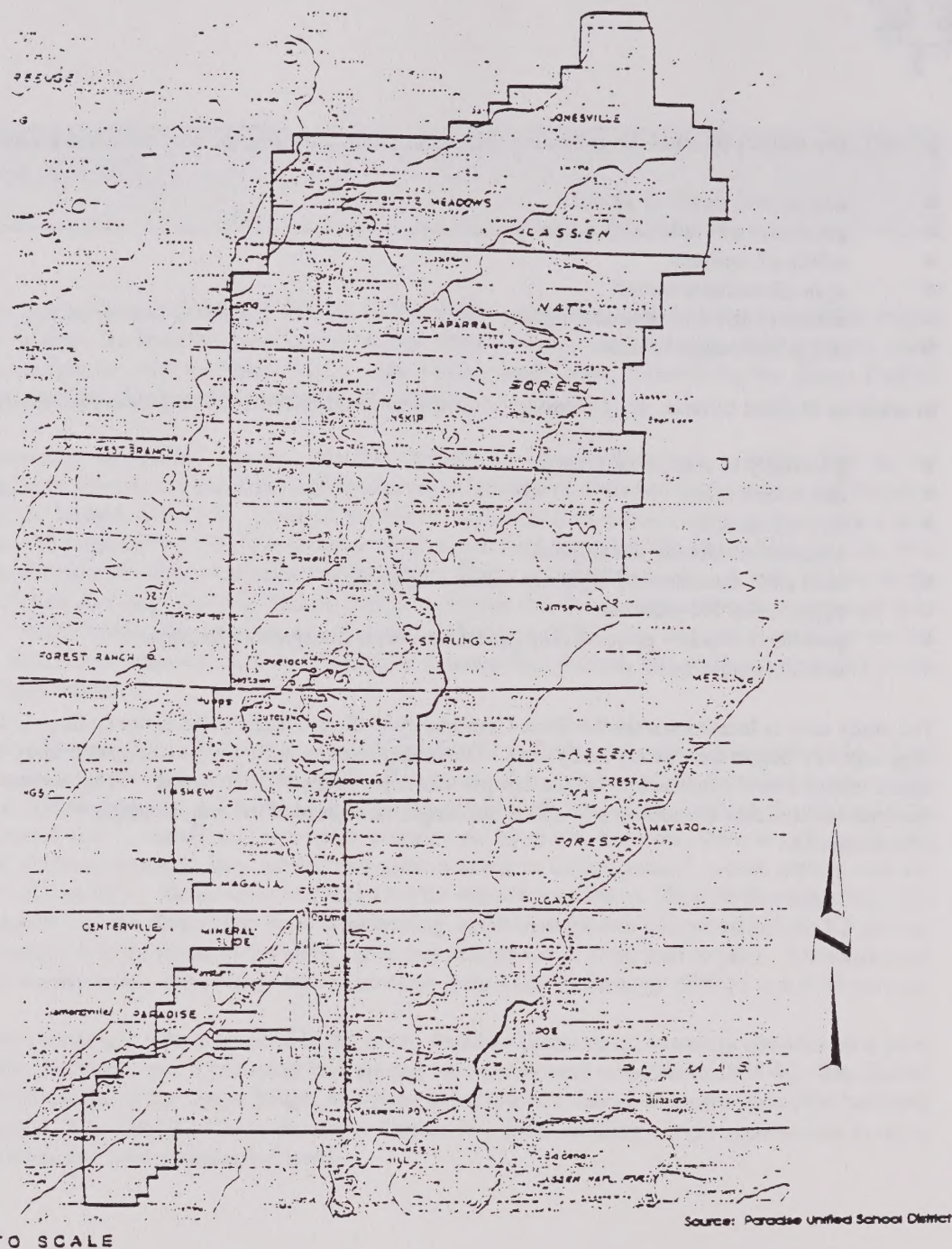
In 1981, the district adopted the following criteria to guide planning for new sites and buildings:

- educational needs of students
- proximity of students to school plants
- safety of students
- ages of students served
- nature of the educational program
- racial and ethnic balance

In addition to these criteria, the following criteria were used in the 1989 *Site Selection Study*:

- proximity to centers of growth
- site accessibility
- site topography
- adjacent residential development
- land size, minimum of eight-ten acres, single parcel
- opportunity for joint use
- possible hazards - power lines, gas transmission lines, water hazards
- available services

The study area is located within the Butte Community College District, and Butte College is located along Highway 191 within the tertiary study area. The college has recently prepared a preliminary ten-year plan which includes new construction on the campus and a permanent Chico center. Proposed new on-campus facilities include new classroom and office buildings, an expanded tutoring center, a child care center and a "little theater."



PARADISE UNIFIED SCHOOL DISTRICT BOUNDARIES

FIGURE 14-2

TABLE 14-1
PARADISE UNIFIED SCHOOL DISTRICT
DISTRICT ENROLLMENT 1978-79 THROUGH 1989

SCHOOL	ENROLLMENT	CAPACITY	UNUSED CAPACITY
Elementary Schools			
Pines Elementary	632	632	0
H Brakebill	80	117	37
Ponderosa	1,047	1,029	(18)
Paradise (on YRE)	983	1,300	317
TOTAL ELEMENTARY	2,742	3,078	336
Intermediate School			
Paradise Intermediate	682	603	(79)
High School			
Paradise High School	1,081	1,192	111
TOTAL	4,505	4,873	368

Source: Paradise Unified School District, *Facility Needs and Funding Analysis*, March 1991.

TABLE 14-2
PARADISE UNIFIED SCHOOL DISTRICT
DISTRICT ENROLLMENT 1978-79 THROUGH 1990

School Year	Enrollment	Net Change	Percent Change
1990-91	4,674	161	+3.56
1989-90	4,513	201	+4.66
1988-89	4,312	131	+3.13
1987-88	4,181	135	+3.33
1986-87	4,046	57	+1.43
1985-86	3,989	140	+3.64
1984-85	3,849	43	+1.13
1983-84	3,806	-24	-0.63
1982-83	3,830	80	+2.13
1981-82	3,750	76	+2.07
1980-81	3,674	-16	-0.04
1979-80	3,690	127	+3.56
1978-79	3,563		

Source: Paradise Unified School District, September 1989; Wade Associates; March 1991, Shilts Consultants, Inc.



14.7 PARKS AND RECREATION

Parks and recreation services are provided by the Paradise Recreation and Park District, a special district established in 1948. The district encompasses 169 square miles, including the Upper and Lower Ridge and the Town of Paradise. The district boundaries extend beyond the *General Plan* study area. The district, as well as other entities own, operate and maintain the facilities described in Table 14-3 containing approximately 415 acres. The district also operates numerous recreational services including programs for senior citizens, adult sports, teens, youth and children's programs and aquatics.

The district receives revenues from property taxes, impact fees ("Quimby" fees, which are imposed upon all subdivision and parcel maps) required by the Town of Paradise, fees for recreational programs, and grants (primarily from state park bond funds). The town subdivision ordinance requires that, as a condition of approval of a final subdivision or parcel map, the subdivider must dedicate land, pay an in-lieu fee, or both, at the option of the town and the recreation and park district, based on the formula contained in the ordinance. The ordinance is based upon a standard of three acres of park land per 1,000 population. The draft Butte County *Energy, Natural Resources and Recreation Element* proposes to establish Quimby fees in the unincorporated area.

The district operates several facilities in cooperation with the Paradise Unified School District, and makes facilities such as the swimming pool available for use by the schools. Current recreation and park district projects include improvements to Paul Byrne Park and Bille Park. Some of the identified recreational needs include a second pool, two additional lighted softball diamonds and additional soccer practice and play fields. In addition to providing youth activities, the district is also one of the largest employers of youth in the community.

State and federal parks and facilities are also used by residents of the study area. These facilities are listed in Table 14-4. In addition to the parks and facilities listed in Tables 14-3 and 14-4, there are a number of public and private trails which are used by the public for walking, jogging, bicycle and horseback riding. These trails are listed in Table 14-5.

TABLE 14-3
PARK AND RECREATION FACILITIES

PARK	TYPE OF LAND	FUTURE PLANS	DESCRIPTION
Bille Park	Bille Park contains definite evidence of Indian inhabitation		Located on the west end of Bille Road in Paradise, this fifty-four acre day-use facility contains both group and individual picnic areas, barbecues, children's play equipment, a hiking trail, restrooms, water and electricity (will accommodate 100 people)
Coutolenc Park	320 acres of unimproved land with public access for hiking.		This park is located on Coutolenc Road 2.5 miles north of the Skyway. The archery club uses portions of the park to operate an archery range.
Crain Memorial Park	Six-acre facility		Located near the Concow Reservoir, this facility contains picnic tables, chemical toilets, and open areas for softball
Aquatic Park and Rotary Grove Park	Three-acre facility		Located on Buschmann Road in Paradise, this facility contains a swimming pool, fishing pond for ages twelve and under, picnic areas, barbecue facilities, ball sports area in joint use with Paradise Intermediate School, children's play equipment, volleyball court, restrooms and parking
Ball Parks			Located on Moore Road in Paradise, this facility contains two lighted ball parks, children's play equipment, a fenced riding area, horse arena, picnic tables and restrooms

PARK	TYPE OF LAND	FUTURE PLANS	DESCRIPTION
Recreation Center	This is a 2.5 acre facility		Located at 6626 Skyway in Paradise, this facility serves as a community center that includes a kitchen, meeting rooms, offices and indoor restrooms. Outside facilities include a volleyball court, basketball court, a horseshoe pit, children's play equipment, picnic tables, a gazebo and outdoor restrooms.
Paradise Reservoir	This is a reservoir area maintained by the Paradise Irrigation District. The water shed area is 8.3 square miles, with 11,500 acre feet of water, and a shoreline of 7.5 miles.		Located on North Lake Road, this area provides shoreline fishing in designated area. Boating is restricted to row boats, canoes and boats propelled by electric trolling motors. Swimming and overnight camping are prohibited. There are twelve picnic tables, two sets of toilets and children's play equipment on the grounds.
Rifle range			Located three miles north of Skyway on Coutolene Road, it is co-sponsored by the Paradise Red and Gun Club.
Little League baseball diamonds		Future additions to this facility include a second baseball diamond, a snack bar, restrooms and fourteen poles of light (seven on each field) for night games.	Located at Buschmann Road and Recreation Drive in Paradise, this facility currently has one baseball diamond and a snack bar.
Paradise Memorial Park	This is a 0.5 acre facility		Located at Pearson Road and Mallan Lane, this facility is a picnic area for group and organization use. it accommodated up to 125 people.

Source: Paradise Recreation and Park District, 1993.

TABLE 14-4
STATE AND FEDERAL PARKS AND
RECREATIONAL FACILITIES
WITHIN ONE HOUR DRIVING DISTANCE OF PARADISE

STATE RECREATION AREAS	FEDERAL FACILITIES
Lake Oroville SRA	Plumas National Forest Campgrounds and Recreational Sites
Loafer Creek	Rogers Cow Camp
Bidwell Canyon	Milsap Bar
Kelly Ridge Visitor Center Complex	Bald Rock
Spillway Ramp	Plumas National Forest Ranger Station
Thermalito Forebay North Area	Lewis Flat
Thermalito Forebay South Area	Shady Rest (P.G. & E.)
Lake Oroville SRA Headquarters	Feather Falls Overlook
Lake Oroville SRA Boat-in Camps	Lassen National Forest Campgrounds and Recreation Sites
Goat Ranch	Cherry Hill Campground
Craig Saddle	Philbrook Campground
Foreman Point	West Branch Campground
Bloomer Point	Butte Meadows Campground
Bloomer Knoll	Soda Springs Campground
Bloomer Cove	
Bloomer Group Camp	
Bidwell Mansion State Historic Park	
Sacramento River Park	
Gianelli Bridge, Sacramento River, Highway 32	
Gray Lodge Wildlife Refuge, southwest of Gridley	
Oroville State Wildlife Area	

Source: 1982 Paradise General Plan; Draft Butte County Energy, Natural Resources, and Recreation Element, 1989.

**TABLE 14-5
TRAILS**

TRAIL	DESCRIPTION
Paradise Memorial Trailway	This trail runs on former SPRR right-of-way from Neal Road on the south to beyond the town limits on the north. Presently, it is paved from Fir Street to Wagstaff. Its purpose is to be the main route for nonmotorized access through the town, and will accommodate pedestrian, bicycle and equestrian use.
Rivendell Lane/Rodgers Trail and Wildlife Sanctuary	This trail is privately owned and is not open for public use.
Bille Park Trail	Located in Bille Park, this trail provides a walk by a water grotto, past a large Indian grindstone, towards a vista bluff that overlooks Butte Creek Canyon.
Town Trail	This trail starts at the end of Circle Lane in south Paradise and runs west toward Clear Creek and east toward Dry Creek.
Chrome Mine Trail	Located outside the town limits, this trail runs from Middle Butte Creek to the former chrome mine just south of Aurora Court in Paradise Pines.
Paradise Reservoir Trail	Also outside the town limits, this trail starts east of Paradise Reservoir Dam and runs around the lake to a point 2.6 miles north of North Lake Road.
Ponderosa Way Trail	This trail runs along the Ponderosa Road cut to Nimshew Ridge Road.
Merchants Bar Road Trail	This trail runs along Merchants Bar Road to Merchants Bar at Little West Branch of the Feather River.
Magalia Dam Trail	This trail runs on the east side of the Little Butte Creek.
Valley Ridge Trail and Valley View Trail	Both these trails have been acquired as roadway and no longer exist.

Source: Town of Paradise, 1991.



14.8 WATER SERVICE

The primary and secondary study areas are served by two water purveyors: Paradise Irrigation District and Del Oro Water Company. Of these, Paradise Irrigation District is the major supplier, with approximately 9,802 service connections serving about ninety-five percent of the incorporated town. Del Oro Water Company serves Paradise Pines district, a large unincorporated, rural residential community immediately north of Paradise, with a population of approximately 9,000, and Magalia District (a county water district recently acquired by the Del Oro Water Company), serving about 400 acres between Paradise Pines and the Town of Paradise, and providing water to approximately 300 households and fifteen businesses. It also serves the Lime Saddle District, 2,750 acres extending south from the Town of Paradise to Lake Oroville. A small urbanized area of the Lime Saddle District has been annexed to the Town of Paradise; it is an urbanizing district with planned service to more than 1,000 homes (see Figure 14-3 for water purveyor boundaries).

Paradise Irrigation District

The district obtains its water from a series of two reservoirs on Little Butte Creek (Magalia Reservoir and Paradise Reservoir). The reservoir system has a storage capacity of 14,140 acre feet, and the firm annual yield is calculated at 7,860 acre feet. Water is transported to the town through a single transmission line. Distribution lines, booster pumps and surface-level tank reservoirs serve various pressure zones throughout the town. Calculated per capita water usage has varied since 1980 from 245 to 289 gallons per day.

The Paradise Irrigation District staff indicates that the district must, subject to voter financing approvals, undertake three major steps to enable its functions - water supply and distribution to keep pace with anticipated growth:

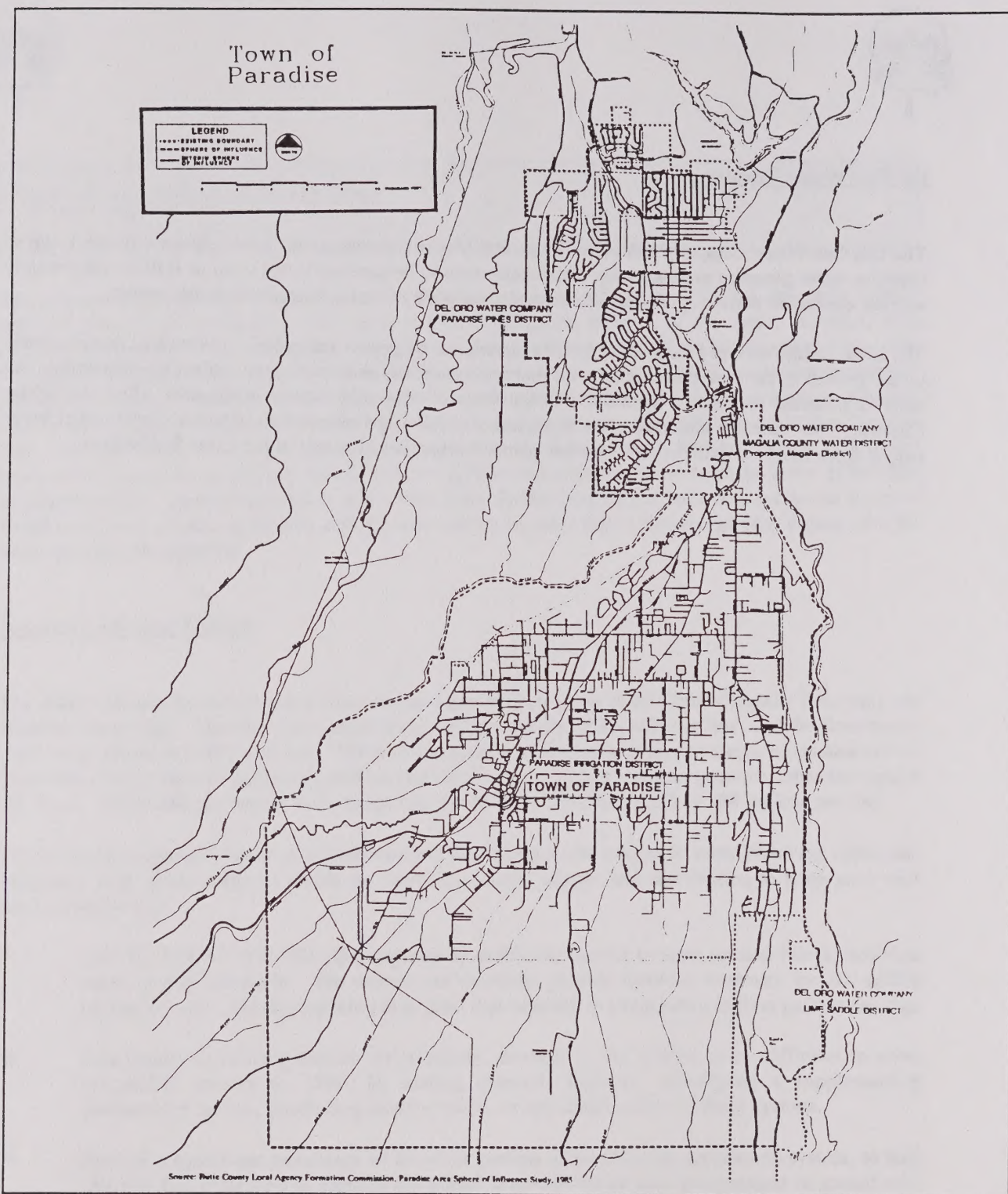
- Add, by June of 1993, filtration capacity to enable the district to meet revised federal and state water quality standards. The district can currently provide filtration treatment for six million gallons per day, and is proposing to expand that capacity to twenty-five million gallons per day.
- Supplement its existing surface water supply, deemed by the district to be sufficient to serve community growth to 1996, by adding reservoir capacity, developing a supplementary groundwater source, purchasing surface water, or any combination of these options.
- Replace a significant percentage of the older portion of its 180 mile distribution system, to both improve fire protection to existing developed areas and allow new development in accord with modern fire protection requirements.



Del Oro Water Company

The Del Oro Water Company's Paradise Pines and Magalia service areas have relevance to the Town of Paradise water planning program only if the areas were to be annexed to the town or if their water supply sources conflicted with proposed additional water supplies essential to maintain town growth.

The Lime Saddle service area's water system planning is of greater relevance. It is evident that continued urban growth in the area may significantly impact community resources from a planning standpoint, and there is potential for further annexation to the town of new subdivisions in the area. Del Oro Water Company has recently undertaken the legal and physical steps essential to obtain a supplemental water supply from Lake Oroville to serve further planned urban development in the Lime Saddle area.



WATER SERVICES BOUNDARIES

FIGURE 14-3



14.9 WASTEWATER

The Town of Paradise is the largest unsewered incorporated community in California. Wastewater treatment facilities within the town consist of individual privately owned septic tanks and soil absorption disposal systems known as leach fields, together with several engineered subsurface disposal systems serving commercial and institutional facilities. In anticipation of an eventual need for centralized wastewater management facilities, portions of a future sanitary sewer system have been constructed along the Skyway. However, there are no existing connections to the system. Businesses and residences in the vicinity of the future sewer system continue to rely on septic tank/leach field systems for wastewater treatment and disposal.

The typical residential septic system installation in Paradise consists of a two-chambered septic tank, measuring approximately 1,000 gallons in volume, connected to about 150 feet of leach field piping. Within the septic tank, heavy solids settle and decompose, leading to the formation of a sludge blanket which must be periodically removed. Grease and other floatables are trapped in a scum layer which forms behind the baffles. In a properly designed, well maintained, septic tank forty to seventy-five percent of the total soluble solids (TSS) and twenty-five to sixty percent of the biological oxygen demand (BOD) are removed. However, septic tank effluent still contains large quantities of pathogenic microorganisms and nutrients. Effluent from the septic tank enters the leach field where physical, chemical and biological processes within the soil provide further treatment and disposal of the wastewater.

Studies

The Town of Paradise authorized several studies, commencing in 1981, to examine the integrity of existing individual wastewater collection and disposal systems (septic tank and leach field design), the extent and degree of water quality degradation and the various alternatives for development of an integrated community wastewater collection, treatment and disposal system. These studies are listed below:

- *Town of Paradise Wastewater Management Study, Phase I Report*, J. M. Montgomery Consulting Engineers, May 1983.
- *Town of Paradise Wastewater Management Study Supplementary Phase I Report*, George Tchobanoglous, March 1984.
- *Town of Paradise Wastewater Management Plan, Phase II Report*, R. A. Ryder and Associates, September 1985.
- *Town of Paradise Wastewater Collection, Treatment, and Disposal Preliminary Design Report*, Volumes 1, and 2, Nolte and Associates, July 1992.



The Town of Paradise contracted with Kennedy/Jenks/Chilton Consulting Engineers to prepare a feasibility study to examine the formation of a central area wastewater assessment district for wastewater collection, treatment and disposal. This study recommended the formation of an assessment district to fund the design and construction of wastewater collection, treatment and disposal facilities.

Current Status

A wastewater design assessment district was formed to finance steps preliminary to construction of a wastewater collection, treatment and disposal facility, including but not limited to environmental impact reports, feasibility studies, engineering plans, cost estimates, legal expenses, the acquisition of easements and rights-of-way. The district withstood a legal challenge and hired a project manager and a consulting engineering firm.

Previous engineering studies have recommended a bifurcated system, with the commercial core of the community being served by a formal centralized collection, treatment and disposal facility, while the balance (the predominantly residential portion of the community) is to remain on septic systems with an onsite wastewater management district to monitor and manage the individual systems.

The plan envisioned a formal sewerage system serving the high wastewater flow areas of the town, including the commercial and multifamily areas, together with the industrial area and other areas with poor soil characteristics. The success of the program is believed to be founded upon the ability to operate an onsite wastewater management district that will care for existing systems, with minimal alterations, for the foreseeable future. The onsite district was formed townwide in May 1992 and has become a town function. The stated purpose of the onsite wastewater maintenance district (zone) is to protect the public health and safety, protect surface and subsurface water quality, conserve water and to minimize the rate and tax expense of the community. The district is intended to accomplish the following tasks:

- Oversee the periodic inspection of all onsite wastewater disposal systems within the zone.
- Provide continuing educational programs for the users of all onsite wastewater disposal systems relating to the proper use, maintenance and repair of said systems.
- Provide reviews and approvals of all repairs and alterations to the existing systems in accordance with the town adopted design guideline manual.
- Provide reviews and approvals for all new onsite wastewater disposal systems that may be installed within the zone in accordance with the town adopted design guideline manual.
- Maintain a water quality monitoring program that will detect any changes in the water quality of the community.



- Initiate remedial actions as may be necessary to assure the protection of the public health and safety and to assure a nondegradation of the community water quality.

The onsite district contains three or more zones, ranging from a zone requiring only simple onsite suitability determinations, to areas with high flow and/or marginal onsite suitability determinations. The latter areas may require community leach fields or other unique solutions.

In May of 1992 the town formally adopted the manual for the onsite treatment of wastewater intended to facilitate the orderly development of wastewater management within the district (zone). It provides technical guidance for siting, design, construction and inspection of onsite wastewater treatment and disposal systems. Approved procedures, design and siting criteria, materials, methods, administrative policies and enabling legislation are described in detail in the manual.

After an advisory measure for a limited community collection sewer system was defeated by Paradise voters in November of 1992, the Town Council took action to postpone all work efforts associated with the sewer project for a minimum of three years.



15.0 SCENIC AND CULTURAL RESOURCES

Scenic and aesthetic resources and views are one of the study area's greatest assets. The forested nature of the town and the surrounding areas, the number of vegetation communities and the range of topography combine to offer a fairly unique variety of visual experiences within a relatively compact geographic area. Views range from valley and canyon panoramas to forest and ridge lines. From some vantage points, the Sutter Buttes and the Coastal Range are visible on clear days.

Residential development is located primarily in forested areas. Trees have been cleared for various commercial and industrial development, some of which is less visually pleasing. The overall ambience is rustic and natural, a genuine community asset which can be enhanced through local policies, guidelines and/or ordinances.

Table 15-1 lists identified historical landmarks and historic structures within and near the study area.

Ethnographic Background

Paradise lies within territory formerly held by the Northwestern *Maidu* or *Konkow* Indians, who inhabited much of what is now Butte County. These people spoke dialects similar to the Northeastern or Mountain *Maidu*, who occupied the upper Feather River basin in much of what is now Plumas County, and the Southern *Maidu* or *Nisenan*, who occupied portions of the mountains and the Central Valley to the south within the Bear, Yuba, and American River basins. Like most native Californians, the *Konkow* were divided into territorial groups known to anthropologists as "tribelets" or "village communities." These consisted of two or more politically confederated villages led by the head man of the most prominent village. Each tribelet was sovereign in matters of land ownership, reaction to trespass, war, and ceremonies. The head man was often assisted by lesser officials and a council of elders. Most tribelet leaders "ruled" by virtue of their wisdom, experience, and acquired respect, rather than through any real authority. Tribelets were the largest social and political unit among most California Indians.

The *Konkow* tribelet was centered around Concow Valley, while the *Michoopda* tribelet claimed the area around Chico and are believed to have foraged within the foothills east of Chico. Some anthropologists believe there was a tribelet in the vicinity of present-day Cherokee called *Ti'-mah*, who may also have foraged on portions of Paradise Ridge. It may be impossible to determine which of these groups actually claimed or inhabited Paradise. All of these tribelets could have maintained settlements or exploited resources in the area at various times. Major villages were located atop the crests of ridges high above the rivers or part of the way down the walls of the canyons on mid-slope benches, particularly where there were springs.



Acorns, deer, and fish provided dietary staples, which were supplemented by a vast variety of small game, seeds, nuts, fruits, and berries. The *Konkow* exploited their environment very systematically. Far from being randomly nomadic, they planned seasonal hunting and foraging rounds to arrive at specific places during peak productivity of certain resources. Their semi-sedentary lifestyle would be impossible without technologies for preserving and storing food resources. For example, these technologies enabled them to convert vast, but seasonal surpluses of acorns and salmon into reliable year-round staples.

Even before the arrival of large numbers of Euro-American settlers and miners, the Indians were affected by white civilization. In 1833, an epidemic of what is believed to have been malaria was brought into the California Central Valley from Oregon by fur trapping parties. As many as seventy-five percent of the native people in the Valley and lower foothills died. The Indians never recovered from this catastrophe and were thus unable to resist the invasion of their homeland during and after the Gold Rush.

Along with epidemics and armed attacks, the Indians had to contend with the destruction of the fisheries and other resources by gold miners and the exclusion of Indians from prime hunting and food gathering lands claimed by white settlers. They were soon reduced to poverty, becoming homeless refugees in their own country. During the late 1850s and 1860s, many surviving Northwestern *Maidu* were removed to the Round Valley Indian Reservation.

A few *Maidu* Indians reside in Butte and Plumas Counties today. Many are involved in efforts to revive their native language and culture.

Prehistory

Archaeological excavations in Messilla Valley in the southeastern corner of the study area suggested to archaeologists that five distinctive cultural expressions had occupied the region over the last three or four thousand years. From youngest to oldest, they are called the Historic Complex (A.D. 1830 to 1850), which clearly represents the archaeological remains of the Northwestern *Maidu*, the Oroville Complex (about A.D. 1500 to 1830), the Sweetwater Complex (about A.D. 800 to 1500), the Bidwell Complex (about A.D. 1 to 800), and the somewhat enigmatic Mesilla Complex (possibly 1000 to 2000 B.C. to A.D. 1). Many archaeologists feel that the Bidwell Complex marks the appearance of *Maidu*-speaking people in the area, although this has not yet been confirmed. At least one prominent archaeologist has hypothesized that the *Konkow* arrived no earlier than about A.D. 1400, while several archaeologists have recently unearthed evidence they believe suggests even the Mesilla Complex people were *Maiduan*.

The Mesilla Complex bears certain similarities to Central Valley and high Sierran cultures of the same period, including the Martis Complex of the Lake Tahoe and Truckee basin areas. However, most archaeologists now recognize the Martis and Mesilla as distinct cultures.

There is tantalizing evidence for much earlier human presence in many northern Sierra Nevada locations, although none of the evidence is as yet unequivocal. This evidence, in the form of large, relatively crude projectile points that were used for spears — the bow and arrow was not introduced until about



A.D. 500 — indicates Great Basin origins. In 1990, fairly substantial radiocarbon evidence was found for settlement of the central Sierra Nevada in Calaveras County nearly 10,000 years ago.

The California Archaeological Inventory, Northeast Information Center, California State University, Chico, has prepared a map of archaeologically sensitive areas for the Town of Paradise. The map indicates a preponderance of known sites roughly south of Honey Run Road and Pearson Road, with a particular concentration in the Lime Saddle area. The map indicates that "land disturbing projects" south of the line must be surveyed by a qualified archaeologist prior to land disturbance, and that projects north of the line must be reviewed by the center to determine if an archaeological survey will be necessary.

TABLE 15-1
HISTORICAL STRUCTURES AND LANDMARKS

SITE/STRUCTURE/ LANDMARK	TYPE	LOCATION	DESCRIPTION
"Thankful" Lewis Landmark	Sign	Pentz and Williams Road (before Butte College)	Landmark to "Thankful" Lewis, only survivor of an Indian attack on herself and two brothers while they were walking to school in 1863
Clear Creek Cemetery Lewis Children Memorial	Marker	Clear Creek Cemetery Road (off East Clark Road)	Memorial to James and John Lewis who were captured and killed by the Mill Creek Indians in July 1863
Elliott Springhouse	Structure with plaque	Lower Neal Road	In memory of Alexander McClure Elliott 1829-1917, who settled on this site in 1867. Elliott Road was named for this early resident
Sierra Polytechnic Institute	Sign	Pearson Road and College Hill Road	This institute offered education for ninth-fourteenth grades so ridge residents did not have to travel to Chico. Established in 1904, it was the equivalent to two years of college
Skyway and Foster Triangle Park	Park	Skyway and Elliott Roads	Dedicated to the beautification of Paradise by the Paradise Chamber of Commerce
Southern Railroad Depot Building and the Washington Plaza Memorial Park	Depot with park	Black Olive Drive and Pearson Road	This depot was built by Southern Pacific in approximately 1903. The Washington Plaza Memorial Park was the area that surrounds the depot. It was created by the community of Paradise and beautified in 1929
Old Paradise Historical Marker	Marker	East side of Clark Road and Elliott Road	Commemorates the original business section of Paradise, known in the 1860s as Leonard's Mill. The first community hall, school, church and post office were located at this site. Then it was bypassed when the railroad was build in 1903
Dogtown Nugget Monument California Historical Landmark No. 771	Plaque	Skyway at Inspiration Point, Magalia	This marker symbolizes the discovery of the first large gold nugget in California weighing fifty-four pounds on April 12, 1859

SITE/STRUCTURE/ LANDMARK	TYPE	LOCATION	DESCRIPTION
Magalia Depot Building	Site	Skyway and Coutolenc Road	This was built in 1903 on the Southern Pacific Line for lumber and passenger service from Stirling City. Last passenger service was in the 1950s and all log hauling was discontinued in May 1974, when the Stirling City Mill was closed
Magalia Cemetery	Plaque	Magalia Cemetery Road	On July 15, 1973 a plaque was dedicated at the Magalia Cemetery honoring the pioneers who settled Dogtown in 1850 and Mr. and Mrs. John Hupp donors of the land.
Eugene J. DeSabra, Jr.	Plaque	West side of Skyway near DeSabra Reservoir Dam	Eugene DeSabra was a promoter and developer of the hydroelectric system on the ridge, which later became PG&E
Stirling City Historical Marker	Sign	Stirling City	A sign describing the early history of Stirling City and explaining the history of the famous Diamond Match Company
Stirling City Historical Marker	Sign	Inskip	The first hotel was built in 1857 by Mr. Kelly. John Stakes purchased the hotel in 1866. It was destroyed by fire in March 1868. The present building was erected later in the same year. The gold strike of the 1850s brought the population to over a thousand making it a booming township
Inskip Pioneer Cemetery	Plaque	Inskip	The names on the wooden markers have completely disintegrated with the passage of time. Inscribed on the surrounding fence are the words: "Those who rest here are only known to God."
Sank Spring	Plaque	Chaparral	Dedicated by Jesse Sank, pioneer, to his wife Cornelia Lott.
Nimshew Cemetery	Plaque	Nimshew	Honoring pioneers of the area, Saul and Rebecca Rugh
Honey Run Covered Bridge	Monument	Honey Run Road and Butte Creek	Monument of early pioneering which connects the Honey Run grade with the Humbug Road. It was built for the purpose of providing a shorter route to the mountains as well as a closer access to points of shipping on the Sacramento River. The bridge was erected in 1894 by George Miller

SITE/STRUCTURE/ LANDMARK	TYPE	LOCATION	DESCRIPTION
Gold Nugget Museum	Museum	502 Pearson Road	While this building is not a historical landmark, most of the history of Paradise and historical artifacts are located here.

Source: State Office of Historic Preservation; 1982 Paradise General Plan; Draft Butte County Energy, Natural Resources and Recreation Element, 1989.



16.0 RELATIONSHIP TO OTHER PLANS

16.1 BUTTE COUNTY GENERAL PLAN

Butte County has recently started work on a comprehensive update of the *Butte County General Plan*. The existing land use plan for the Paradise area, the *Paradise Area Land Use Plan*, was adopted by the Butte County Board of Supervisors in 1981, and generally encompasses the area corresponding to the primary and secondary study areas. The area within the 1981 Paradise town limits is primarily designated for medium density residential development (seven-thirteen dwelling units per gross acre) and low density residential development (one-six dwelling units per acre). Some areas paralleling the Skyway and along Clark Road are designated for high density residential development (fourteen-twenty dwelling units per acre), and most of the length of the Skyway and an area along Clark Road are designated for commercial development. Selected sites are designated for industrial and public use. No explanation is provided regarding the relatively high residential densities shown on the plan in the absence of a community sewer system.

With regard to the secondary study area, the communities of Paradise Pines and Magalia are designated for low density residential development. Surrounding areas, north to Coutolenc Road, are primarily designated agricultural residential (one-forty acres per dwelling units). The easterly portion of the area is designated timber mountain (forty acre minimum parcel size), grazing and open lands (forty acre minimum parcel size) and public, and the westerly portion is designated grazing and open lands.

To the east of the *Paradise Area Land Use Plan* boundaries, the county has adopted the *Concow Area Land Use Map*. This map designates a majority of the area as timber-mountain, with three sizable areas designated for foothill area residential (one-forty acres per dwelling units). The majority of the area abutting the *Paradise Area Land Use Plan* boundaries to the north and east is designated timber-mountain; and to the west, grazing and open land. Within the tertiary study area, lands are designated agricultural residential, grazing and open land, and public (Butte College).

The county has adopted a general plan amendment entitled the *Paradise Urban Reserve Policy Statement* and has designated an area as "Urban Reserve" south of the town limits (south Paradise area). The area is shown in Figure 16-1. The area was formerly designated agricultural residential. This general plan amendment established the following policies for the south Paradise area:

- The county's land use policy, zoning and subdivision shall be coordinated with the Town of Paradise and any other service district within the Urban Reserve.



- The Urban Reserve designation permits rural residential development and uses on parcels of not less than forty (40) acres in those areas designated by the California Department of Fish and Game (DFG) as NO DEVELOPMENT ZONES for the protection of critical deer herd winter ranges (see Figure 6-4), and twenty (20) acres on all other properties until such time as they are needed for development and adequate services are available to serve this area.
- Any proposal for a general plan amendment, rezoning or subdivision which would permit parcels of less than twenty (20) acres to be created shall be coordinated with all public agencies which provide utility and public services as well as the plans of the Town of Paradise for extension of water, sewer, circulation, drainage, and shall be accompanied by the following plans prior to or concurrently with the adoption (summarized).
 - capital improvement plan
 - park and open space plan
 - environmental plan
 - street and transportation plan
 - health department standards
 - fiscal plan
- Any parcel which is now less than forty (40) acres which was legally created, pre-existing, and nonconforming may be developed according to its zoning.
- Development standards compatible with the Town of Paradise shall be utilized for urban development projects within the Urban Reserve.

The definitions of the "land use plan designations" contained in the *Butte County General Plan* which apply to the portions of the study areas outside the area subject to the *Paradise Urban Reserve Policy* are summarized as follows:

- Grazing and open land - livestock grazing, animal husbandry, intense animal uses and animal matter processing.
- Timber-mountain - forest management and the harvesting and processing of forest products.
- Agricultural residential - agricultural uses and single-family dwellings at rural densities.
- Foothill area residential - single family dwellings at rural densities.
- Low density residential - detached single-family dwellings at urban densities.
- Medium density residential - a mixture of urban residential uses, including detached single-family homes, condominiums, multiple-dwelling structures, mobile home parks, group quarters and care homes.



- **High density residential** - higher-density urban residential uses, including condominiums, multiple-dwelling structures, mobile home parks, group quarters and care homes.
- **Commercial** - structures and activities providing a full range of merchandise and services to the general public.
- **Industrial** - processing, manufacturing, packaging, storage and distribution of goods and commodities.
- **Public** - large facilities owned and operated by government agencies, including schools, colleges, airports, dams and reservoirs, disposal sites, recreation facilities, conservation areas, fire stations and other government buildings and property.

Land Use Element policies which are particularly relevant to the Paradise area include the following:

- Regulate development in identified winter deer ranges to facilitate the survival of deer herds.
- Prevent development and site clearance other than river bank protection of marshes and significant riparian habitats.
- Protect valuable scenic areas and parks for enjoyment by residents and visitors.
- Encourage compatible land use patterns in scenic corridors and adjacent to scenic waterways, rivers, and creeks.
- Provide open space areas near and between designated urban areas on the land use map.
- Promote the development of new industry in the county.
- Allow agricultural uses and farm animals in designated residential areas where appropriate.
- Correlate residential densities to soil, slope and other natural site characteristics.
- Relate residential densities to intensity and compatibility of adjacent uses.
- Balance residential densities with traffic-carrying capacities of existing and proposed circulation plans.
- Support water development projects needed to supply local demands.
- Control development in watershed areas to minimize erosion and water pollution.
- Consult with incorporated cities and neighboring counties in the development of planning proposals for areas of mutual concern.



- Designate adequate land for free-market competition among land suppliers to avoid artificially constricting land availability.
- Encourage annexation to existing cities and existing districts.
- Encourage development in and around existing communities with public facilities.
- Encourage urban expansion toward the least productive soils.
- Allow rural residential development as a buffer between urban development and intensive crop land.
- Retain in an agricultural designation on the land use map areas where location, natural conditions and water availability make lands well suited to orchard and field crop use, while considering for non-agricultural use areas where urban encroachment has made inroads into agricultural areas and where past official actions have planned areas for development.
- Maintain extensive areas for primary use as livestock grazing land.
- Prevent scattered development in grazing areas.
- Retain in a grazing-open land category areas on the land use map where location and natural conditions make lands well suited for grazing land, while considering for nongrazing use areas where urban encroachment has made inroads into grazing areas and where past official actions have planned areas for development.
- Retain in a "timberland" category areas on the land use map where location and natural conditions make lands well suited for timberland, while considering for nontimber use areas where urban encroachment has made inroads into timber areas and where past official actions have planned areas for development.

The *Circulation Element* of the *Butte County General Plan* was adopted in 1984. It includes assessments of projected traffic growth for the following planning areas with relevance to the *Paradise General Plan*:

- **Upper Ridge** - Significant population growth in this mountain planning area will cause need for a capacity expansion of the Skyway from Paradise Pines to the Town of Paradise sometime during the 1990s. Also, it will be important to ensure adequate access for rapid evacuation in case of a wildland fire emergency in this planning area. The Upper Ridge will continue to have a very high percentage of senior citizens, and public transportation development for this area should be encouraged as part of a Paradise area transit system.
- **Paradise** - The Paradise planning area is almost entirely under the jurisdiction of the Town of Paradise. The town has developed a circulation forecast to 1990 which shows the need for several street collector extensions to better serve east-west travel demand in the community.



- **Concow** - The population of the Concow area is forecasted to triple by the year 2000. However, because of extremely low trip generation rates expected by the area's rural population, traffic growth rates will increase slowly, resulting in no needed capacity expansion of primary roads to the area.
- **Central Butte** - This foothill planning area's population growth rate forecast is the highest in Butte County to the year 2000; more than a 600 percent increase over 1980. This is due to a very large inventory of land with a designation of agricultural residential (A-R) in the *Land Use Element*. This area is located mostly south of the Town of Paradise and totals approximately 12,500 acres. The development of potential from the A-R designation is extremely variable due to its wide density range (one-forty acres per dwelling unit) allowed. This kind of density range does not allow the development of a confident traffic forecast for the planning area.

The planning area presents special problems for circulation planning and forecasting, in that the area is largely undeveloped, contains difficult terrain, and could potentially impact circulation plans and programs in the Town of Paradise and Chico. Before significant developments occur in this area, a comprehensive plan should be developed for this planning area.

Circulation Element policies which are particularly relevant to the Paradise area include the following:

- The transportation system shall be developed in a manner consistent with specified land use densities and estimated trip generation capabilities and which is consistent with the policy to encourage development in and around existing cities and community centers.
- Circulation plans for the county's foothill areas should be designed around patterns which encourage development near existing highway corridors and emphasize development near existing rural community centers.
- The most important roads and highways should be designed and maintained to the highest possible level of service and convenience. The least important roads and highways should receive only the improvements necessary to maintain their structural integrity and operational safety.
- Encourage development in areas that can be served by public roads in a manner that does not become an economic burden to the county, over time.
- It is suggested that the utilization of county road funds should focus on completing projects with a higher priority before completing a lower priority project.
- Rural arterial road and highway traffic capacity levels should be planned to provide a level of service "B," and be considered to be providing acceptable service at level of service "C" when fiscal, environmental, or site constraints are prohibitive.
- Land uses that would preclude the timely development of right-of-way needed for new roads or expansion of existing roads shall be prohibited.



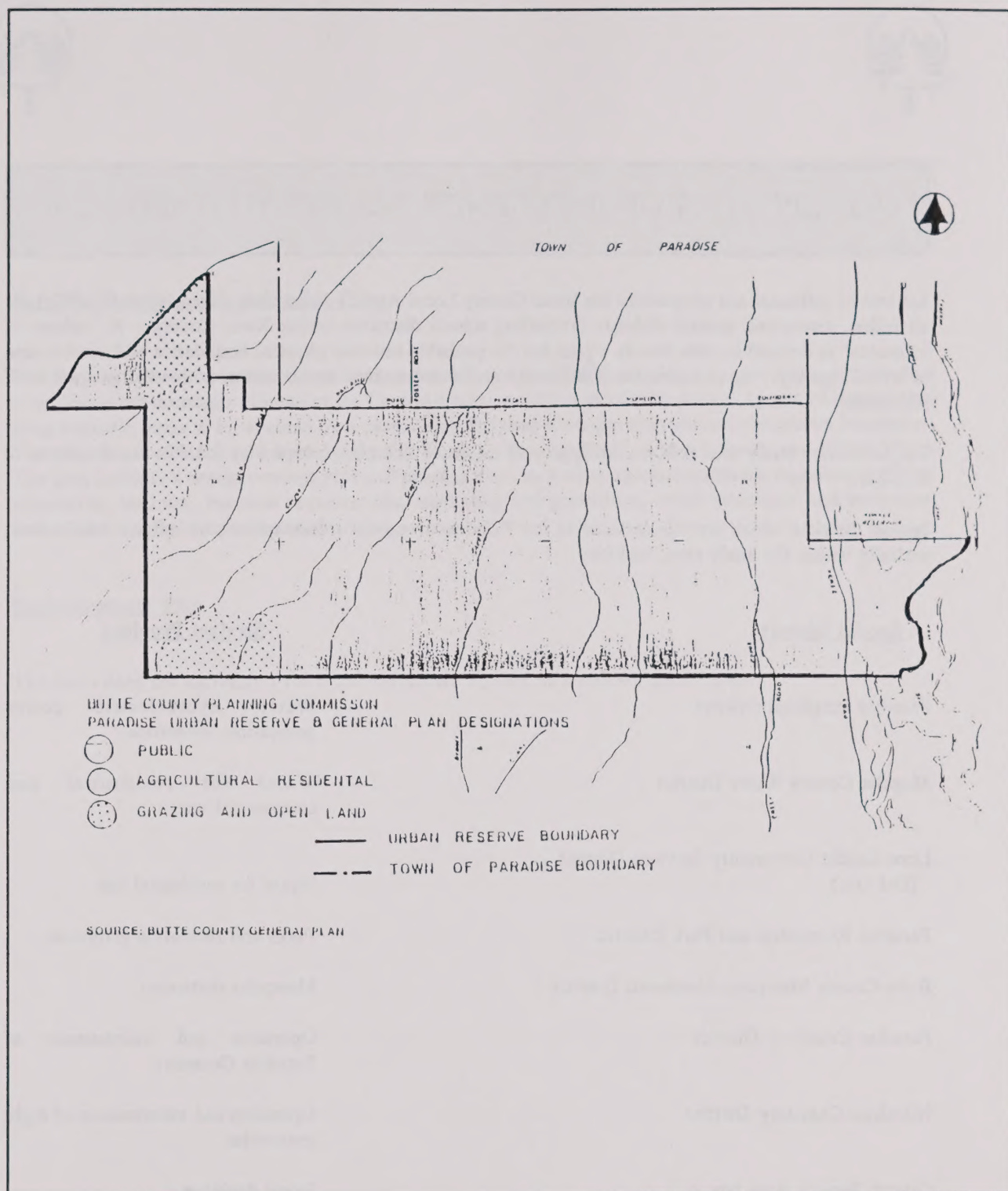
- All road systems, both public and private, shall provide for the safe evacuation of residents and adequate access for fire and other emergency services by providing at least two means of emergency access to an interconnected collector system.
- The county will work with the Butte County Fire Department and the California Division of Forestry towards developing emergency evacuation routing plans for developing foothill and mountain areas with extreme fire hazard potential.
- The county will consider city-initiated circulation element amendments to the county transportation element.
- The county and its cities should develop mutual and complementary policies regarding the timing and phasing of new urban area developments, as necessary for the logical and timely development of each urban area circulation network.
- The county will jointly coordinate circulation capital improvement programs with the respective cities.
- Urban street and highway traffic capacity levels should be planned to provide a level of service "C," and be considered to be providing acceptable service at level of service "D" when fiscal, environmental or site constraints are prohibitive.
- Urban area street improvement standards should conform to city street standards and circulation plans for each respective city.
- The county shall support local public transportation services in the three largest urban areas and adequate intercity service to the Chico, Oroville, Paradise, Gridley-Biggs, and Palermo areas.
- The county will encourage the cities to prepare and propose comprehensive urban area bicycle plans to the county for review and adoption.
- Construction or expansion of all major arterials shall consider bicycle paths of Class II or better.
- The county shall implement measures in unincorporated areas that provide for the continued safe operation of airports.
- The county will support the cities in the encouragement of ridesharing and carpooling programs by large employers and public agencies.

The *Circulation Element* also identifies the following state highway and other road projects in the Paradise area which have current or projected capacity-safety problems that will need correction during the 1981-2000 planning period:



- **State Route 99** - 0.8 mile north of Pentz Road to 0.4 mile south of the Skyway overcrossing. This segment of highway is presently near capacity and should be widened to a four-lane expressway in the near future.
- **Skyway** (Paradise area) - Realignment of the Skyway between Coutolenc Road and 0.2 mile inside of the northern Town of Paradise limits. This portion of the Skyway between the Town of Paradise and Paradise Pines is at or near capacity. The realignment would follow the improved grade of the abandoned Southern Pacific rail line to Stirling City, making construction of a two-lane expressway along this segment possible.

The county has circulated a draft *Natural Resources, Recreation and Energy Element*. The existing *Noise and Safety Elements* were discussed in previous sections of this document.



PARADISE URBAN RESERVE

FIGURE 16-1



16.2 SPHERES OF INFLUENCE

Spheres of influence are adopted by the Butte County Local Agency Formation Commission (LAFCo) for all cities, towns and special districts (excluding school districts) within Butte County. A "sphere of influence" is defined in state law as a plan for the probable ultimate physical boundaries and service area of a local agency. Annexations to cities, towns and districts must be consistent with adopted spheres of influence.

The secondary study area follows the sphere of influence boundary adopted by LAFCo for the Town of Paradise.

Special districts which provide services to the Paradise area, and whose spheres of influence lie at least partially within the study area, include:

<u>Special District</u>	<u>Services Provided</u>
Paradise Irrigation District	Water, hydroelectric power generation, recreation
Magalia County Water District	Water for residential and commercial use
Lime Saddle Community Services District (Del Oro)	Water for residential use
Paradise Recreation and Park District	Parks and recreation programs
Butte County Mosquito Abatement District	Mosquito abatement
Paradise Cemetery District	Operation and maintenance of Paradise Cemetery
Nimshew Cemetery District	Operation and maintenance of eight cemeteries
County Service Area No. 4	Storm drainage



16.3 TOWN OF PARADISE

Paradise Downtown Revitalization Plan

The *Paradise Downtown Revitalization Plan* was adopted in 1986 to provide the town with a tool leading to an improved economic climate in the Central-Business district (CBD) by providing sets of time-phased programmatic goals to be attained by a partnership between town government and downtown businesses. The plan focuses on the area bounded by the Skyway, Pearson Road, Almond Street, and Elliott Street. The plan includes a design concept plan and phasing plan, as well as recommendations regarding parking, circulation, land use, business organizations, marketing and promotion, target businesses and industries, beautification, improvements and financing.

Redevelopment Plan

The town does not currently have a redevelopment agency or a redevelopment plan



16.4 BUTTE COUNTY AIR QUALITY ATTAINMENT PLAN

The California Clean Air Act transportation planning requirements mandate that nonattainment areas for ozone and carbon monoxide develop air quality plans by July 1991. Therefore, the Butte County Air Pollution Control District, in coordination with transportation agencies (BCAG), is required to coordinate, adopt and implement various transportation controls to meet specific performance standards outlined in the Act. Butte County is coordinating with other Northern Sacramento Valley counties (Shasta, Tehama, Glenn, Colusa, Sutter and Yuba) in the preparation of this plan.

The *Air Quality Attainment Plan* for the Northern Sacramento Valley Air Basin has been prepared in compliance with the Clean Air Act and submitted to the Air Resources Board. The plan is designed to achieve a reduction in district-wide emissions of five percent or more per year for each nonattainment pollutant or its precursors, averaged every consecutive three-year period. By law, the five percent requirement is calculated against the 1987 actual emission level of each nonattainment pollutant or its precursor.

According to the plan, it does not demonstrate a five percent reduction of the pollutant levels, as the control efficiencies and cost-effectiveness are not available for many of the proposed control strategies. The plan states that it does, however, include every feasible control measure and a schedule of adoption for the control measures.

The plan provides that Butte County must reduce reactive organic gases (ROG) emissions by 12.39 tons per day, and reduce nitrogen oxides (NO_x) emissions by 7.58 tons per day by 1994, in order to comply with the requirements of the Clean Air Act. The county must reduce ROG emissions by 17.70 tons per day and reduce NO_x emissions by 10.83 tons per day by 1997, and must reduce ROG emissions by 23.00 tons per day and reduce NO_x emissions by 14.08 tons per day by 2000.

The draft plan contains proposed community contact, educational and public information elements designed to reduce emissions from transportation and area wide sources. The plan also contains a list of feasible control measures, which are proposed to be implemented according to the following schedule:

- All measures ranked No. 1 shall be proposed and implemented by applicable districts no later than July 1, 1992.
- All measures ranked No. 2 shall be proposed and implemented by applicable districts no later than July 1, 1993.
- All measures ranked No. 3 shall be proposed and implemented by applicable districts no later than July 1, 1994 only if attainment of the state ambient air standard for ozone is not achieved by January 1, 1994.



A complete listing of these control measures is included in the plan. The ranking of feasible control measures is based upon technical feasibility, cost-effectiveness, emission reduction potential, rate of emission reductions, public acceptability, and enforceability. The control measures include a new source review rule (requirements for permitting new and modified stationary sources of air pollution), indirect source review (sources which generate or attract motor vehicle activity, including shopping centers, residential and commercial developments, government buildings, medical facilities, office buildings, hospitals, hotels, restaurants, etc.), and transportation control measures, for which each district will develop measures that are appropriate for only its own jurisdiction.



16.5 BUTTE COUNTY HAZARDOUS WASTE MANAGEMENT PLAN

The County of Butte has prepared a Hazardous Waste Management Plan in accordance with state law. The plan contains information on sites that may be potentially suitable for various hazardous waste facilities, including transfer and storage facilities, treatment and recovery facilities, and solidification for storage or residuals repositories. The plan describes the various facilities as follows:

Transfer and Storage Facilities

Hazardous waste transfer and storage facilities generally serve as collection stations for industrial waste, but could also be used for household waste. Materials are frequently stored on site until quantities are sufficiently large to be shipped economically to treatment or recycling facilities.

At transfer stations, hazardous wastes are examined and analyzed to confirm their identity, degree of hazard, and compatibility with other wastes. They are then separated as liquids, solids, and sludges according to their overall chemical characteristics, and are kept separate from incompatible wastes. Drums may be transferred directly out of the transporting vehicle to the storage area, or they may be transferred by forklift from a receiving area to the storage buildings. Uncontainerized dry solid hazardous waste is transferred to bins or tanks by dump truck or a conveyor system. Uncontainerized liquids, sludges and slurries are transferred by pipeline from tank trucks to appropriate storage tanks. Wastes are subsequently transported from a transfer/storage facility to a treatment, recovery, incinerator or residuals repository.

- **Treatment and Recovery Facilities:** Hazardous waste treatment facilities can occupy anywhere from three to thirty acres. A large facility can treat up to 200,000 tons of liquid wastes annually. This volume would likely require 185 tanker trucks or 120 rail cars annually. Visually, the aqueous treatment center resembles a municipal sewage treatment plant.

Water contaminated with hazardous wastes, for example, arrives at a treatment facility from a transfer station, from a liquid organics recovery facility or sometimes from a large waste generator. Various processes are used to remove heavy metals, reactive ions and organic matter. The segregated wastes are then neutralized and/or oxidized to precipitate metals or to detoxify selected chemicals. Treated wastewater effluent is discharged either to a sewer or to an evaporation pond. The sludges that are formed are sent to an incinerator, to a biological waste converter or are stabilized for land disposal.

Liquid hazardous wastes containing solvents, oils and other organics arriving at the recovery facility are analyzed at an onsite laboratory to identify those constituents valuable enough to recycle. Decisions are made regarding those components which will be reclaimed, incinerated



or converted to usable or stable residues. Solvents and oils are separated and clarified, respectively, by physical processes such as distillation, condensation and filtration. Toxic vapors are destroyed by incineration or are collected on adsorbents. The purified solvents and oils are sorted, recycled, blended into fuels, or shipped out as industrial raw materials. Residues or sludges from this facility are incinerated, extracted for metals, or "stabilized" prior to land disposal. Wastes remaining after recovery procedures have been completed are then sent to an aqueous waste treatment facility for further processing.

- **Solidification for Storage or Residuals Repositories:** Some hazardous wastes that cannot be recycled, treated or destroyed can be solidified or stabilized. Liquid wastes and sludges can be solidified by use of special additives. Inorganic sludges can be fixed by adding lime and fly ash. Other wastes can be encapsulated in asphalt or plastic coatings for lengthy storage or ultimate retrieval.

A solidification facility would constitute a large industrial building with several tall silos attached for storage of dry chemicals. These facilities generally require one-ten acres. Transportation requirements would vary depending on the volume of waste handled.

- **Residuals Repositories:** Residuals repositories are designed for long-term storage of wastes that have been treated and/or reduced to the maximum extent feasible. They would be sited only in areas that meet conditions set forth in Subchapter 15, Title 23 of the California Administrative Code governing the disposal of wastes to land. The residuals to be stored at these facilities are solids, with low organic content, and with inorganic components that are relatively insoluble. These solids are among the most inert and least mobile wastes presented for land disposal. An example of residuals potentially suitable for long-term storage would be the solids from pretreatment from sewage treatment facilities. The facility would be designed and operated to keep materials dry in order to prevent the formation of leachate. Thus, a properly designed and well operated residuals repository should present very low environmental risk.

Using a "constraints and opportunities mapping" process, the county has selected candidate areas that may be "appropriate for siting the various facilities." Maps contained in the plan show portions of the Town of Paradise, the secondary and tertiary study areas, as "potentially suitable" or "potentially usable with adequate mitigation measures." The plan also recognizes, however, that:

Butte County does not generate enough hazardous waste to warrant siting more than community transfer and collection stations...potential areas for siting treatment and residuals repository facilities are reflected in the plan only to comply with DHS (Department of Health Services) guidelines. The advisory committee will, however, meet with the surrounding rural counties to establish multi-county agreements for any treatment or residuals repository facilities determined to be needed in the larger geographical area.

State law provides that the Town of Paradise, and all Butte County cities, must incorporate the approved *Hazardous Waste Management Plan* into the town's *General Plan* within a specified time frame.



16.6 BUTTE COUNTY AIRPORT LAND USE COMMISSION

The Butte County Airport Land Use Commission has adopted the *Paradise Skypark Airport Land Use Plan* (1985) for the airport and the surrounding area. The plan establishes planning boundaries around the Paradise Skypark Airport area of influence, and sets forth appropriate land uses, including building height restrictions, to the extent that such land is not already devoted to incompatible uses. The plan's stated objective is "to promote the orderly development of lands contiguous to the Paradise Skypark Airport in a manner which safeguards the general welfare of the inhabitants, assures the safety of air navigation, and maintains the utility" of the airport.

According to this plan, "In general, the Paradise Skypark Airport may be described as a safe airport because the past accident record is entirely free of incidents involving the public or the public welfare. In addition, structures do not now intrude into the air space requirement of the airport and no future problem with height restrictions is foreseen." The plan also includes noise policies to assure that new land uses in the airport environs are compatible with aircraft-generated noise. The plan recommends that Butte County, in conjunction with the Town of Paradise, begin negotiations with owners of the land in each of the clear zones to purchase, exchange, or acquire avigation easements for the land. Appendix E includes the plan's "Land Use Guidelines for Safety Compatibility," and the clear zones and approach zones are shown in Figure 7-4.



16.7 BUTTE COUNTY REGIONAL TRANSPORTATION PLAN/CONGESTION MANAGEMENT PROGRAM

The Butte County Regional Transportation Plan and Congestion Management Program constitutes a strategy for regional transportation in Butte County. The program and plan were prepared by Butte County with the assistance and participation of local municipalities.

TOWN OF PARADISE

1994 GENERAL PLAN

VOLUME III ENVIRONMENTAL SETTING DOCUMENT

APPENDICES

TOWN OF PARADISE

1994 GENERAL PLAN

VOLUME III ENVIRONMENTAL SETTING DOCUMENT

APPENDIX A

APPENDIX A

COMMUNITY CONCERNS SUMMARY REPORT

I. LIST OF COMMUNITY ISSUES/CONCERNS

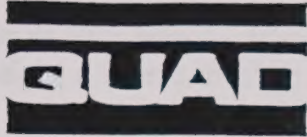
Based on meetings with Town staff and the General Plan Revision Steering Committee, the following Town issues and concerns relevant to the General Plan update process have been identified:

- Growth management--need for comprehensive statement
- Butte County and other city General Plan updates
 - Chico
 - Oroville
- General Plan planning area and level of planning detail
 - Interest in Highway 99 and communities to north of Paradise
- Time frame for General Plan
- Housing
 - Density
 - Lot size
 - Location
 - Size and cost
 - Mix of housing types
- Sewer system and method of wastewater disposal
 - Pressure for higher densities if sewers are installed
- Need for open space policy
- Jobs/housing balance
- Circulation
 - Access
 - Lack of cross-streets
 - Road width (number of lanes)
 - Emergency response
 - Alternative transportation systems
- Community character (rustic nature)
- Parks
- Economic development
 - Tourism
 - Downtown revitalization
 - Redevelopment
 - Cluster vs. strip
- Historic/cultural resources
- Public services and infrastructure
- Level of municipal services and expectations of Town residents
- Water
 - Quantity
 - System capacities (domestic and fire flow)
 - Quality
- Air quality
- Solid waste pickup (mandatory or voluntary?)
- Street lights

- Relationship between public service capacity and growth
- Location of important mineral resources
- Need for realistic, implementable, internally consistent General Plan
- Tree preservation and replacement
- Viewshed protection
- Need for unique development standards

II. SUMMARY OF COMMUNITY SURVEY RESULTS

[WHEN AVAILABLE]



2530 J Street, Suite 302
Sacramento, CA 95816
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916 447-1700

MEMO

TO: General Plan Steering Committee and Town staff

FROM Roberta MacGlashan

RE: Citizens' Opinion Survey Results

DATE: May 9, 1991

Attached are the results of the Citizens' Opinion Survey of 300 Paradise residents conducted by volunteers during the months of March and April, 1991. The survey instrument was designed by the General Plan Steering Committee, Town staff and QUAD Consultants, and was based in part on the Citizens' Attitude Survey conducted in March, 1981.

Where questions were comparable, results from the 1981 survey are included for purposes of comparison. Some of the highlights, or most notable differences between 1981 and 1991 include the following:

- Decrease in the number of survey respondents age 60 and older, and corresponding increase in the number of respondents between the ages of 18 and 40. This suggests a shift in the age composition of the population to a younger median age.
- Decrease in the percentage of the labor force working in the Town of Paradise from 1981 to 1991.
- Increase in the percentage of shopping dollars spent outside the Town of Paradise from 1981 to 1991.
- By a margin of 2 to 1, respondents believe that parking is adequate in Paradise.

- Over 55 percent of respondents prefer Paradise to grow at a lower rate or not at all; 43 percent prefer the present rate, and only 3.9 percent prefer a higher rate of growth.
- One-quarter to one-half-acre lots are the preferred lot size for single family homes.
- Almost 80 percent believe there should be an active attempt to increase job opportunities in Paradise.
- The highest interest in recreational facilities is in foot and bicycle paths, followed by nature areas and an auditorium.
- While 36.8 percent would improve traffic conditions by encouraging the use of alternative forms of transportation, 70 percent would use bus service only occasionally or not at all.

Results of the survey are accurate within 3 to 4 percentage points.

While this survey provides much information of interest, it cannot be all things to all people and questions of equal interest could not be asked due to length. Survey results will be supplemented by input from the General Plan Steering Committee, the four Subcommittees and citizens at public meetings and hearings.

**TOWN OF PARADISE
CITIZENS' OPINION SURVEY
March-April 1991
(with comparisons to March 1981 survey)**

1. How many persons are living at this address?

Persons	Percent
1	22.8
2	42.8
3	14.9
4	12.3
5	3.6
6 or more	3.6
Average household size = 2.5	

2. Of the persons living in this household, how many are in each of the following age groups?

Age Group	1991 Survey %	1981 Survey %
< 18	21.6	20.7
18-40	27.9	22.1
40-60	21.0	17.7
60+	29.5	39.5

7. How many persons in this household are physically disabled?

Year	Percent of Population Disabled
1991	8
1981	7

8. Thinking of your shopping dollar, what percentage do you estimate is spent outside of the Town of Paradise?

% of Shopping \$	1991 %	1981 %
< 10	25.8	68.3
11-20	18.1	11.8
21-50	29.8	13.0
51 or more	26.2	6.9

9. On the subject of shopping, what changes would encourage you to do more shopping in Paradise?

Changes	%
Better variety of shopping opportunities	55.2
Discount grocery store	56.3
Off-price retail center	35.7
Enclosed mall	31.4
More parking	20.2
Improvement in customer relations	23.5
Additional automobile dealerships	18.8
Establishment of a bus system	27.4
Development of mini-rest areas with shade, benches & drinking fountains	21.7

11. Complaints have been received about the manner in which businesses have been located in the Town of Paradise. Would you prefer business be...

Location	1991 %	1981 %
Concentrated in a few centers located at major street intersections	41.0	54.3
Located throughout the downtown area	21.4	NA*
Restricted to a few primary streets	15.9	27.6
Spread throughout neighborhoods townwide	21.7	18.0

* Not asked in 1981

12. Is parking adequate in Paradise?

	%
Yes	67.8
No	32.2

13. If no, exactly where in Paradise do you feel parking is inadequate?

Location	1991 %	1981 %
Shopping Centers	23.9	NA
Old Downtown	100.0 ¹	9.5
Parks	8.0	NA
Town Hall	12.5	NA
Skyway	NA	20.3
Other	19.3 ²	6.9

16. What do you dislike most about the growth of Paradise since you have lived here.

Dislikes	%
Increase in traffic	59.2
General increase in noise, crowds and hustle-bustle of the community	23.1
Increased strain on our public services such as law enforcement, fire protection and road maintenance	45.5
A loss in the serenity that once existed in Paradise	32.9
Increased potential of ground water pollution resulting from additional septic systems	42.2
Just plain too many people	26.0
The decrease in the size of residential lots	20.9
Don't dislike anything about growth	9.4
Other	20.9

Note: Same as No. 15

17. In your opinion, what type of housing is most needed in the Town of Paradise?

Housing Type	1991 %	1981 %
Single family homes	50.9	68.9
Mobile homes in parks	9.7	9.8
Mobile homes on lots	11.2	11.2
Apartments	17.7	10.0
Condominiums	15.9	NA
Low-Income Housing	27.8	NA
Moderate-Income Housing	46.9	NA

	%
Yes	53.6
No	46.4

21. If yes, what monthly rate would you be willing to pay?

Monthly rate	%
\$1-4	38.1
\$5-10	47.5
\$11-20	7.6
More than \$20	1.7
Other/don't know	5.1

22. Should there be an active attempt to increase the number of job opportunities in Paradise?

	%
Yes	78.8
No	21.2

	Low		Range		High	
Facility	1	2	3	4	5	No Opinion
Exercise, jogging & fitness	17.0	15.6	25.7	15.6	15.9	10.1
Lighted ball fields	13.8	10.5	21.0	17.0	26.4	11.2
Year-round swimming pool complex	17.0	11.2	18.8	14.5	26.4	11.9
Botanical & community gardens	19.9	14.9	21.7	17.4	13.8	12.3
Other	(Most frequent answers) Youth Center/Facilities, Tennis Courts, Bowling Alley, Library					

25. If a local bus system were to be established to serve the Paradise community, how often would you use it?

Frequency	1991 %	1981 %*
Daily	6.1	11.3
2-4 times per week	10.5	36.2
Once a week	9.0	11.0
Occasionally	27.1	41.5
Not at all	43.3	(44.7)

* Asked only of those responding that they would use a bus system if it was established.

28. What two things do you most **dislike** about living in Paradise?

Most frequent responses:

Growth
Politics/Town government
Lack of shopping and restaurants/high prices
Leaf burning
Lack of services
Water situation
Traffic
Elderly drivers
Lack of opportunities (social, employment, recreational)

29. What is it that you consider to be the most unique characteristic of Paradise?

Most frequent responses:

Trees, wildlife
Mountain environment/location/beauty
Friendliness/lifestyle
Gold Nugget Days
Retirement community

30. What other concerns do you have about the services provided by the Town of Paradise, about present or future land uses, or particular problems not covered in this survey?

Most frequent responses:

Police and fire service needs more support
Growth/better planning
Other services and facilities (refuse, sewers, water, roads, library, schools)
Politics
Over-regulation
Sewer system

TOWN OF PARADISE

1994 GENERAL PLAN

VOLUME III ENVIRONMENTAL SETTING DOCUMENT

APPENDIX B

APPENDIX B

A PARTIAL CHECKLIST OF BUTTE COUNTY WILDLIFE

Common Name	Scientific Name
AMPHIBIANS AND REPTILES	
California newt	<i>Taricha torosa</i>
Rough-skinned newt	<i>Taricha granulosa</i>
California slender salamander	<i>Batrachoseps attenuatus</i>
Ensatina	<i>Ensatina eschscholtzii</i>
Western toad	<i>Bufo boreas</i>
Southern spadefoot	<i>Scaphiopus multiplicatus</i>
Pacific treefrog	<i>Hyla regilla</i>
Red-legged frog	<i>Rana aurora</i>
Mountain red-legged frog	<i>Rana muscosa</i>
Foothill yellow-legged frog	<i>Rana boylei</i>
Bullfrog	<i>Rana catesbeiana</i>
Western pond turtle	<i>Clemmys marmorata</i>
Western fence lizard	<i>Sceloporus occidentalis</i>
Sagebrush lizard	<i>Sceloporus graciosus</i>
Gilbert's skink	<i>Eumeces gilberti</i>
Western skink	<i>Eumeces skiltonianus</i>
Western whiptail	<i>Cnemidophorus tigris</i>
Northern alligator lizard	<i>Gerrhonotus coeruleus</i>
Southern alligator lizard	<i>Gerrhonotus multicarinatus</i>
Ringneck snake	<i>Diadophis punctatus</i>
Sharp-tailed snake	<i>Contia tenuis</i>
Racer	<i>Coluber constrictor</i>

Common Name	Scientific Name
Striped racer	<i>Masticophis lateralis</i>
Gopher snake	<i>Pituophis melanoleucus</i>
Common kingsnake	<i>Lampropeltis getulus</i>
California mountain kingsnake	<i>Lampropeltis zonata</i>
Common garter snake	<i>Thamnophis sirtalis</i>
Western terrestrial garter snake	<i>Thamnophis elegans</i>
Western aquatic garter snake	<i>Thamnophis couchi</i>
Western rattlesnake	<i>Crotalus viridis</i>
Northern red-legged frog	<i>Rana aurora aurora</i>
California horned lizard	<i>Phrynosoma coronatum frontale</i>
BIRDS	
Eared grebe	<i>Podiceps nigricollis</i>
Western grebe	<i>Aechmophorus occidentalis</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Great blue heron	<i>Ardea herodias</i>
Great egret	<i>Casmerodius albus</i>
Snowy egret	<i>Egretta thula</i>
Green-backed heron	<i>Butorides striatus</i>
Tundra swan	<i>Olor columbianus</i>
Greater white-fronted goose	<i>Anser albifrons</i>
Snow goose	<i>Chen caerulescens</i>
Ross' goose	<i>Chen rossii</i>
Canada goose	<i>Branta canadensis</i>
Gadwall	<i>Anas strepera</i>
Ring-necked duck	<i>Anas collaris</i>

Common Name	Scientific Name
Mallard	<i>Anas platyrhynchos</i>
Northern pintail	<i>Anas acuta</i>
Green-winged teal	<i>Anas crecca</i>
Cinnamon teal	<i>Anas cyanoptera</i>
Purple martin	<i>Progne subis</i>
American wigeon	<i>Anas americana</i>
Northern shoveler	<i>Anas clypeata</i>
Wood duck	<i>Aix sponsa</i>
Redhead	<i>Aythya americana</i>
Canvasback	<i>Aythya valisineria</i>
Ruddy duck	<i>Oxyura jamaicensis</i>
Common goldeneye	<i>Bucephala clangula</i>
Barrow's goldeneye	<i>Bucephala islandica</i>
Bufflehead	<i>Bucephala albeola</i>
Common merganser	<i>Mergus merganser</i>
Turkey vulture	<i>Cathartes aura</i>
Cooper's hawk	<i>Accipiter cooperi</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Northern goshawk	<i>Accipiter gentilis</i>
Black-shouldered kite	<i>Elanus caeruleus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Golden eagle	<i>Aquila chrysaetos</i>
Northern harrier	<i>Circus cyaneus</i>
Prairie falcon	<i>Falco mexicanus</i>
Merlin	<i>Falco columbarius</i>
American kestrel	<i>Falco sparverius</i>

Common Name	Scientific Name
California quail	<i>Callipepla californica</i>
Wild turkey	<i>Meleagris gallopavo</i>
Virginia rail	<i>Rallus limicola</i>
American coot	<i>Fulica americana</i>
Killdeer	<i>Charadrius vociferus</i>
Common snipe	<i>Gallinago gallinago</i>
Spotted sandpiper	<i>Actitis macularia</i>
Western sandpiper	<i>Calidris mauri</i>
Least sandpiper	<i>Calidris minutilla</i>
Ring-billed gull	<i>Larus delawarensis</i>
California gull	<i>Larus californicus</i>
Band-tailed pigeon	<i>Columba fasciata</i>
Rock dove	<i>Columba livia</i>
Mourning dove	<i>Zenaida macroura</i>
Common barn-owl	<i>Tyto alba</i>
Western screech-owl	<i>Otus kennicottii</i>
Great horned owl	<i>Bubo virginianus</i>
Northern pygmy-owl	<i>Glaucidium gnoma</i>
Spotted owl	<i>Strix occidentalis</i>
Long-eared owl	<i>Asio otus</i>
Short-eared owl	<i>Asio flammeus</i>
Northern saw-whet owl	<i>Aegolius acadicus</i>
Burrowing owl	<i>Athene cunicularia</i>
Common poor-will	<i>Phalaenoptilus nuttallii</i>
Common nighthawk	<i>Chordeiles minor</i>
White-throated swift	<i>Aeronautes saxatalis</i>
Black-chinned hummingbird	<i>Archilochus alexandri</i>

Common Name	Scientific Name
Anna's hummingbird	<i>Calypte anna</i>
Allen's hummingbird	<i>Selasphorus sasin</i>
Rufous hummingbird	<i>Selasphorus rufus</i>
Belted kingfisher	<i>Ceryle alcyon</i>
Northern flicker	<i>Colaptes auratus</i>
Acorn woodpecker	<i>Melanerpes formicivorus</i>
Lewis woodpecker	<i>Melanerpes lewis</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
Downy woodpecker	<i>Picoides pubescens</i>
Nuttall's woodpecker	<i>Picoides nuttallii</i>
Pileated woodpecker	<i>Drycopus pileatus</i>
Western kingbird	<i>Tyrannus verticalis</i>
Ash-throated flycatcher	<i>Myiarchus cinerascens</i>
Black phoebe	<i>Sayornis nigricans</i>
Say's phoebe	<i>Sayornis saya</i>
Willow flycatcher	<i>Empidonax traillii</i>
Dusky flycatcher	<i>Empidonax oberholseri</i>
Western flycatcher	<i>Empidonax difficilis</i>
Western wood-pewee	<i>Contopus sordidulus</i>
Horned lark	<i>Eremophila alpestris</i>
Violet-green swallow	<i>Tachycineta thalassina</i>
Tree swallow	<i>Tachycineta bicolor</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Barn swallow	<i>Hirundo rustica</i>
Cliff swallow	<i>Hirundo pyrrhonota</i>
Scrub jay	<i>Aphelocoma coerulescens</i>
Yellow-billed mapie	<i>Pica nuttalli</i>

Common Name	Scientific Name
Common raven	<i>Corvus corax</i>
American crow	<i>Corvus brachyrhynchos</i>
Plain titmouse	<i>Parus inornatus</i>
Bushtit	<i>Psaltirparus minimus</i>
White-breasted nuthatch	<i>Sitta carolinensis</i>
Red-breasted nuthatch	<i>Sitta canadensis</i>
Wrentit	<i>Chamaea fasciata</i>
American dipper	<i>Cinclus mexicanus</i>
House wren	<i>Trogladytes aedon</i>
Bewick's wren	<i>Thryomanes bewickii</i>
Marsh wren	<i>Cistothorus palustris</i>
Canyon wren	<i>Catherpes mexicanus</i>
Rock wren	<i>Salpinctes obsoletus</i>
Northern mockingbird	<i>Mimus polyglottos</i>
California thrasher	<i>Toxostoma redivivum</i>
American robin	<i>Turdus migratorius</i>
Varied thrush	<i>Ixoreus naevius</i>
Hermit thrush	<i>Catharus guttatus</i>
Western bluebird	<i>Sialia mexicana</i>
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>
Phainopepla	<i>Phainopepla nitens</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
European starling	<i>Sturnus vulgaris</i>
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Tricolored blackbird	<i>Agelaius tricolor</i>

Common Name	Scientific Name
Northern oriole	<i>Icterus galbula</i>
Brewers's blackbird	<i>Euphagus cyanocephalus</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Western tanager	<i>Piranga ludoviciana</i>
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>
Blue grosbeak	<i>Guiraca caerulea</i>
Osprey	<i>Pundion haliaetus</i>
Lazuli bunting	<i>Passerina amoena</i>
Purple finch	<i>Carpodacus purpureus</i>
House finch	<i>Carpodacus mexicanus</i>
American goldfinch	<i>Carduelis tristis</i>
Lesser goldfinch	<i>Carduelis psaltria</i>
Lawrence's goldfinch	<i>Carduelis lawrencei</i>
Rufous-sided towhee	<i>Pipilo erythrophthalmus</i>
Brown towhee	<i>Pipilo fuscus</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Grasshopper sparrow	<i>Ammodramus savannarum</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
Lark sparrow	<i>Chondestes grammacus</i>
Rufous-crowned sparrow	<i>Aimophila ruficeps</i>
Chipping sparrow	<i>Spizella passerina</i>
Dark-eyed junco	<i>Junco hyemalis</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Golden-crowned sparrow	<i>Zonotrichia atricapilla</i>
Fox sparrow	<i>Passerella iliaca</i>
Song sparrow	<i>Melospiza melodia</i>
Ferruginous hawk	<i>Buteo regalis</i>

Common Name	Scientific Name
MAMMALS	
American badger (rare)	<i>Taxidea taxus</i>
Beaver	<i>Castor canadensis</i>
Belding ground squirrel	<i>Citellus beldingi</i>
Big brown bat	<i>Eptesicus fuscus</i>
Black bear (rare)	<i>Euarctos americanus</i>
Black-tailed jackrabbit	<i>Lepus californicus</i>
Bobcat	<i>Lynx rufus</i>
Botta pocket gopher	<i>Thomomys bottae</i>
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>
Brush mouse	<i>Peromyscus boylei</i>
Brush rabbit	<i>Sylvilagus bachmani</i>
California mastiff bat	<i>Eurnops perotis</i>
California meadow mouse	<i>Microtus californicus</i>
California mouse	<i>Peromyscus californicus</i>
California myotis	<i>Myotis californicus</i>
California ground squirrel	<i>Spermophilus beecheyi</i>
Coyote	<i>Canis latrans</i>
Deer mouse	<i>Peromyscus maniculatus</i>
Douglas squirrel	<i>Tamiasciurus douglasii</i>
Dusky-footed woodrat	<i>Neotoma fuscipes</i>
Fringed myotis	<i>Myotis thysanodes</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Great Basin pocket mouse	<i>Perognathus parvus</i>
Hairy-winged myotis	<i>Myotis volans</i>
Heerman kangaroo rat	<i>Dipodomys heermanni</i>
Hoary bat	<i>Lasiurus cinereus</i>

Common Name	Scientific Name
Little brown myotis	<i>Myotis lucifugus</i>
Lodgepole chipmunk	<i>Eutamias speciosus</i>
Long-eared chipmunk	<i>Eutamias quadrimaculatus</i>
Long-eared myotis	<i>Myotis evotis</i>
Long-tailed meadow mouse	<i>Microtus longicaudus</i>
Lump-nosed bat	<i>Plecotus townsendii</i>
Montane meadow mouse	<i>Microtus montanus</i>
Mountain beaver	<i>Aplodontia rufa</i>
Mountain lion (rare)	<i>Felis concolor</i>
Mountain pocket gopher	<i>Thomomys monticola</i>
Mule (black-tailed) deer	<i>Odocoileus hemionu</i>
Muskrat	<i>Ondatra zibethica</i>
Northern flying squirrel	<i>Glaucomys sabrinus</i>
Nuttall cottontail	<i>Sylvilagus nuttallii</i>
Pallid bat	<i>Antrozous pallidus</i>
Pika	<i>Ochotona princeps</i>
Pinyon mouse	<i>Peromyscus truei</i>
Porcupine	<i>Erethizon dorsatum</i>
Raccoon	<i>Procyon lotor</i>
Red bat	<i>Lasiurus borealis</i>
Ring-tail (rare)	<i>Bassariscus astutus</i>
Sierra Nevada golden-mantled ground squirrel	<i>Spermophilus lateralis</i>
Silvery-haired bat	<i>Lasionycteris notivagans</i>
Small-footed myotis	<i>Myotis subalatus</i>
Spotted skunk	<i>Spilogale putorius</i>
Striped skunk	<i>Mephitis mephitis</i>
Townsend's chipmunk	<i>Eutamias townsendii</i>

Common Name	Scientific Name
Townsend mole	<i>Scapanus townsendii</i>
Townsend's western big-eared bat	<i>Plecotus townsendii townsendii</i>
Trowbridge shrew	<i>Sorex troxbridgii</i>
Vagrant shrew	<i>Sorex vagrans</i>
Western gray squirrel	<i>Sciurus griseus</i>
Western harvest mouse	<i>Reithrodontomys megalotis</i>
Western jumping mouse	<i>Zapus princeps</i>
Western pipistrelle	<i>Pipistrellus hesperus</i>
Yellow-bellied marmot	<i>Marmota flaviventris</i>
Yellow pine chipmunk	<i>Eutamias amoenus</i>
Yuma myotis	<i>Myotis yumanensis</i>

COMMON PLANT SPECIES OF THE PARADISE AREA

Common Name

Scientific Name

ANNUAL GRASSES

Foxtail fescue
Hairy orcutt grass
Red brome
Slender wild oats
Sparush brome

Festuca megaiura
Orcuttia pilosa
Bromus rubens
Avena barbata
Bromus madritensis

PERENNIAL GRASSES AND GRASS-LIKE PLANTS

Lemmon stipa
Parish wheatgrass
Perennial bluegrass
Many-stem sedge

Stipa lemmoni
Agropyron parishii laeve
Poa sp.
Carex multicaulis

ANNUAL FORBS

Bidwell's knotweed
California hibiscus
Butte County checkerbloom
Common dwarf flax
Greene's tuctoria
Little tarweed
Red Bluff dwarf rush
Shippee meadowfoam
Slender annual fireweed
Small-flower lotus
Veiny monardella

Polygonum bidwelliae
Hibiscus californicus
Sidalcea robusta
Hesperolinon micranthum
Tuctoria greenei
Madia exigua
Juncus leioispermus var. *leioispermus*
Linnanthus floccosa californica
epilobium minutum
Lotus micranthus
Monardella douglasii var. *venosa*

PERENNIAL FORBS

Aster
Blue dicks
Bolander galium
Bracken fern
Climbing galium
Common woolly-sunflower
Fritillary
Hoover's spurge
Iris
Klamath weed
Morning-glory
Purple milkweed
Purple sanicle
Shasta puccoon
Snake-lily
Sulfur pea
Spear-leaf mountain dandelion
Soap plant
Whitewflower hawkweed
Yellow star-tulip

Aster spp.
Dichelostemma pulchella
Galium bolanderi
Pteridium aquilinum pubescens
Galium nuttallii tenue
Eriophyllum lanatum grandiflorum
Fritillaria spp.
Chamaesyce hooveri
Iris macrosiphon
Hypericum perforatum
Calystegia occidentalis
Asclepias cordifolia
Tauschia kelloggii
Lithospermum californicum
Dichelostemma volubilis
Lathyrus sulphureus
Agoseris retrorsa
Chlorogalum pomeridianum
Hieracium albidiflorum
Calochortus monophyllus

TREES AND SHRUBS

Big leaf maple
 Hard Tack
 Blue oak
 Brewer oak
 California black oak
 California buckeye
 California laurel
 California nutmeg
 California redbud
 California scrub oak
 California yerba santa
 California wild grape
 Canyon live oak
 Chamise
 Deerbrush
 Digger pine
 Douglas-fir
 Freemont silktassel
 Fremont cottonwood
 Foothill ash
 goosberry
 Incense-cedar
 Interior live oak
 Lemmon ceanothus
 Pacific dogwood
 Pipe-stem clematis
 Poison-oak
 Ponderosa pine
 Shrub interior live oak
 Sierra coffeeberry
 Sugar pine
 Toyon
 Wedgeleaf ceanothus
 Western azalea
 Western sycamore
 White alder
 Whiteleaf manzanita
 Willow
 Woodbalm

Acer macrophyllum
Cercocarpus betuloides
Quercus douglasii
Quercus garryana breweri
Quercus kelloggii kelloggii
Aesculus californica
Umbellularia californica
Torreya californica
Cercis occidentalis
Quercus dumosa
Eriodictyon californicum
Vitis californica
Quercus chrysolepis chrysolepis
Adenostoma fasciculatum fasciculatum
Ceanothus integerrimus
Pinus sabiniana
Pseudotsuga menziesii
Garrya fremontii
Populus fremontii
Fraxinus dipetala
Ribes spp.
Calocedrus decurrens
Quercus wislizenii wislizenii
Ceanothus lemmonii
Cornus nuttallii
Clematis lasiantha
Toxicodendron diversilobum
Pinus ponderosa
Quercus wislizenii frutescens
Rhamnus rubra rubra
Pinus lambertiana
Heteromeles arbutifolia
Ceanothus cuneatus
Rhododendron occidentale
Platanus racemosa
Alnus rhombifolia
Arctostaphylos viscida
Salix sp.
Lepechinia claycena

TABLE 4-4A
SENSITIVE SPECIES OF PARADISE AND ADJACENT AREAS

<u>Common Name</u>	<u>Scientific Name</u>	<u>Status</u>		
		<u>Federal</u>	<u>State</u>	<u>CNPS</u>
Hoover's spurge	<i>Chamaesyce hooveri</i>	1		
Adobe lily	<i>Fritillaria pluriflora</i>			
Butte County fritillary	<i>Fritillaria eastwoodias</i>			2
California hibiscus	<i>Hibiscus californicus</i>	2		
Red Bluff dwarf rush	<i>Juncus leiospermus</i> var. <i>leiospermus</i>	2		
Shippee meadowfoam	<i>Limnanthes floccosa californica</i>	1	CE	
Veiny monardella	<i>Monardella douglasii</i> var. <i>venosa</i>	2		
Hairy orcutt grass	<i>Orcuttia pilosa</i>	1	CE	
Bidwell's knotweed	<i>Polygonum bidwelliae</i>	2		
Butte County checkerbloom	<i>Sidalcea robusta</i>			3
Greene's tuctoria	<i>Tuctoria greenii</i>	1	CR	
California red-legged frog	<i>Rana aurora draytoni</i>	2	CSC	
Foothill yellow-legged frog	<i>Rana boylei</i>		CSC	
American badger	<i>Taxidea taxus</i>		CSC	
Golden eagle	<i>Aquila chrysaetos</i>		CFP	
Northern harrier	<i>Circus cyaneus</i>		CSC	
Black-shouldered kite	<i>Elanus caeruleus</i>		CFP	
Prairie falcon	<i>Falco mexicanus</i>		CSC	
Burrowing owl	<i>Athene cunicularia</i>		CSC	

CODES

CE	Listed as Endangered in the State of California
CT	Listed as Threatened in the State of California
CR	Listed as Rare in the State of California
CCE	California Candidate for listing as Endangered
CCT	California Candidate for listing as Threatened
CSC	California Department of Fish and Game Species of Special Concern
CFP	A California Department of Fish and Game "fully protected" species as described in Section 4700 of Chapter 8, Section 5050 of Chapter 2, Division 6, Chapter 1, Section 5515.
FE	Listed as endangered by the Federal Government
FT	Listed as Threatened by the Federal Government
FPE	Proposed as Endangered by the Federal Government
FPT	Proposed as Threatened by the Federal Government
FSS	Federal (BLM and USFS) Sensitive Species
1	Category 1 Candidate for Federal listing (Taxa for which the U.S. Fish and Wildlife Service has sufficient biological information to support a proposal to list as Endangered or Threatened.)
2	Category 2 Candidate for Federal listing (Taxa which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking.)
W	Watch List. Location information for these taxa is not computerized. The NDDDB is currently collecting distribution information but maintains manual files only.

CALIFORNIA NATIVE PLANT SOCIETY (CNPS)

List 1A:	Plants Presumed Extinct in California
List 1B:	Plants Rare, Threatened or Endangered in California and Elsewhere
List 2:	Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
List 3:	Plants About Which We Need More Information - A Review List
List 4:	Plants of Limited Distribution - A Watch List

FISH OF BUTTE CREEK

Common Name

Chinook salmon
Brown trout
Rainbow trout
Steelhead trout
Lamprey
Bluegill
Green sunfish
Redear sunfish
Brown bullhead
Sacramento sucker
Sacramento squawfish
Hitch
Goldfish
Mosquito fish
Catfish
Smallmouth bass

Scientific Name

Oncorhynchus tshawytscha
Salmo trutta
Salmo gairdneri
Salmo gairdneri gairdneri
Lampetrus spp.
Lepomis macrochirus
Lepomis cyanellus
Lepomis microlophus
Lepomis nebulosus
Catostomus occidentalis
Ptychocheilus grandis
Lavinia exilicauda
Carassius auratus
Gambusia affinis
Ictalurus spp.
Micropterus dolomieu

TOWN OF PARADISE

1994 GENERAL PLAN

VOLUME III ENVIRONMENTAL SETTING DOCUMENT

APPENDIX C

APPENDIX C

ACOUSTICAL TERMINOLOGY

- AMBIENT NOISE LEVEL:** The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.
- CNEL:** Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.
- DECIBEL, dB:** A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
- L_{dn} :** Day-Night Average Sound Level. The average equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.
- L_{eq} :** Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is typically computed over 1, 8 and 24-hour sample periods.
- NOTE:** CNEL and L_{dn} represent daily levels of noise exposure averaged on an annual basis, while L_{eq} represents the average noise exposure for a shorter time period, typically one hour.
- L_{max} :** The maximum sound level recorded during a noise event.
- L_n :** The sound level exceeded "n" percent of the time during a sample interval. L_{10} equals the level exceeded 10 percent of the time (L_{90} , L_{50} , etc.)

ACOUSTICAL TERMINOLOGY

NOISE EXPOSURE CONTOURS:

Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and L_{dn} contours are frequently utilized to describe community exposure to noise.

SEL or SENEL:

Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound level for a stated time interval of a noise event, based on a reference pressure of 20 micropascals and a reference duration of one second.

SOUND LEVEL:

The sound pressure level in decibels as measured by a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes very low and very high frequency components of sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

NOISE MEASUREMENT AND MODELING METHODOLOGY

ROADWAYS

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used to develop L_{dn} contours for all highways and major roadways in Paradise. The FHWA Model is the analytical method presently favored for traffic noise prediction by most state and local agencies, including Caltrans. The current version of the model is based upon the CALVENO noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver and the acoustical characteristics of the site. The FHWA Model predicts hourly L_{eq} values for free-flowing traffic conditions, and is generally considered to be accurate within 1.5 dB. To predict L_{dn} values, it is necessary to determine the hourly distribution of traffic for a typical 24-hour day and to adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Short-term (15-minute) traffic noise measurements and concurrent traffic counts were conducted by Brown-Buntin Associates (BBA) for State Route 191/Clark Road, Skyway, Pearson Road and Elliot Road (see Figure 7-1) on March 14, 1991. The noise measurements were made to evaluate the noise exposure due to traffic on those roadways. Instrumentation was a Larson Davis Laboratories (LDL) model 700B integrating sound level meter which was calibrated in the field before measurements using a CA-250 acoustical calibrator.

The purpose of the traffic noise level measurements was to determine the accuracy of the FHWA model in describing the existing noise environment at the project site. Noise measurement results were compared to the FHWA Model results by entering the observed traffic volumes, speed and distance as inputs to the FHWA Model.

Traffic data representing annual average traffic volumes for existing conditions were obtained from Caltrans and Dowling Associates traffic consultants as summarized in Appendix D. Day/night traffic distribution and truck mix were based upon Caltrans and BBA file data. Using these data and the FHWA methodology, traffic noise levels as defined by L_{dn} were calculated for existing (1990) traffic volumes. Distances from the centerlines of selected roadways to the L_{dn} contours are summarized in Table 7-1.

COMMUNITY NOISE SURVEY

A community noise survey was conducted to document noise exposure in areas of the community containing noise sensitive land uses. For that purpose, noise sensitive land uses in the Paradise General Plan Study Area were considered to include residential areas, parks and schools. Noise monitoring sites were selected to be representative of typical conditions in the community.

Short-term noise monitoring was conducted on March 13-14, 1991. Each site was monitored three different times during the day and night so that valid estimates of L_{dn} could be prepared. One long-term noise monitoring site was established in Paradise to record day-night statistical trends. The data collected included the L_{eq} and other statistical descriptors. Noise monitoring sites, measured noise levels and estimated L_{dn} values at each site are summarized in Table 7-2. Monitoring sites are shown by Figure 7-1.

Community noise monitoring systems were calibrated with acoustical calibrators in the field prior to use. The systems comply with all pertinent requirements of the American National Standards Institute (ANSI) for Type I sound level meters.

TOWN OF PARADISE

1994 GENERAL PLAN

VOLUME III ENVIRONMENTAL SETTING DOCUMENT

APPENDIX D

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Impact Analysis Report
Level Of Service

Intersection	Base			Future			Change in	
	LOS	Del/ Veh	V/ C	LOS	Del/ Veh	V/ C		
# 1 Skyway and Pentz Road	C	0.0	0.00	C	0.0	0.00	+	0.00 V/C
# 2 Clark Road and Skyway	D	0.0	0.00	D	0.0	0.00	+	0.00 V/C
# 3 Skyway and Rock Lane	A	0.0	0.00	A	0.0	0.00	+	0.00 V/C
# 4 Skyway and Wagstaff Road	D	23.9	0.95	D	23.9	0.95	+	0.00 V/C
# 5 Skyway and Bille Road	A	17.4	0.52	A	17.4	0.52	+	0.00 V/C
# 6 Skyway and Maxwell Road	A	6.0	0.45	A	6.0	0.45	+	0.00 V/C
# 7 Skyway and Oliver Road	A	12.0	0.48	A	12.0	0.48	+	0.00 V/C
# 8 Skyway and Elliot Road	B	14.1	0.62	B	14.1	0.62	+	0.00 V/C
# 9 Skyway and Honey Run Road	E	0.0	0.00	E	0.0	0.00	+	0.00 V/C
# 10 Skyway and Pearson Road	C	15.6	0.71	C	15.6	0.71	+	0.00 V/C
# 11 Skyway and Neal Road	E	0.0	0.00	E	0.0	0.00	+	0.00 V/C
# 12 Clark Road and Wagstaff Road	A	18.6	0.39	A	18.6	0.39	+	0.00 V/C
# 13 Clark Road and Bille Road	A	14.9	0.51	A	14.9	0.51	+	0.00 V/C
# 14 Clark Road and Central Park	A	7.4	0.39	A	7.4	0.39	+	0.00 V/C
# 15 Clark Road and Elliot Road	B	26.2	0.67	B	26.2	0.67	+	0.00 V/C
# 16 Clark Road and Nunneley Road	A	8.3	0.43	A	8.3	0.43	+	0.00 V/C
# 17 Clark Road and Pearson Road	A	24.9	0.59	A	24.9	0.59	+	0.00 V/C
# 18 Clark Road and Buschmann Road	C	0.0	0.00	C	0.0	0.00	+	0.00 V/C
# 19 Pentz Road and Wagstaff Road	C	0.0	0.00	C	0.0	0.00	+	0.00 V/C
# 20 Pentz Road and Bille Road	B	0.0	0.00	B	0.0	0.00	+	0.00 V/C
# 21 Pentz Road and Pearson Road	B	0.0	0.00	B	0.0	0.00	+	0.00 V/C
# 22 Pentz Road and Stearns Road	A	0.0	0.00	A	0.0	0.00	+	0.00 V/C

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Intersection	Base			Future			Change in
	LOS	Del/ Veh	V/ C	LOS	Del/ Veh	V/ C	
# 26 Elliot Road and Maxwell Drive	E	0.0	0.00	E	0.0	0.00	+ 0.00 V/C
# 27 Pearson Road and Scottwood Roa	D	0.0	0.00	D	0.0	0.00	+ 0.00 V/C
# 29 Sawmill Road and Bille Road	B	0.0	0.00	B	0.0	0.00	+ 0.00 V/C
# 30 Sawmill Road and Elliot Road	A	0.0	0.00	A	0.0	0.00	+ 0.00 V/C
# 31 Sawmill Road and Nunneley Road	A	0.0	0.00	A	0.0	0.00	+ 0.00 V/C
# 32 Sawmill Road and Pearson Road	C	0.0	0.00	C	0.0	0.00	+ 0.00 V/C

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #1 Skyway and Pentz Road

Level Of Service: C												
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1 0 0	0	0	1 0 0	0	0	1 0 0	0	0	1 0 0
Volume Module:												
Initial Vol:	69	508	22	79	374	4	2	6	56	6	11	105
Grade:	0%			0%			0%			0%		
Cycle/Cars:	xxxx xxxx			xxxx xxxx			xxxx xxxx			xxxx xxxx		
Truck/Combi:	xxxx xxxx			xxxx xxxx			xxxx xxxx			xxxx xxxx		
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	76	559	24	87	411	4	2	7	62	7	12	116
Critical Gap Module:												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	6.5	6.0	5.5
Capacity Module:												
Cnflct Vol:	416	xxxx	xxxxx	583	xxxx	xxxxx	1287	1159	418	1218	1150	595
Potent Cap.:	653	xxxx	xxxxx	539	xxxx	xxxxx	168	224	607	184	227	491
% Used Cap.:	11.6	xxxx	xxxxx	16.1	xxxx	xxxxx	1.3	2.9	10.1	3.6	5.3	23.5
Impedance:	0.91	xxxx	xxxxx	0.87	xxxx	xxxxx	xxxx	0.98	0.92	xxxx	0.96	0.81
Actual Cap.:	653	xxxx	xxxxx	539	xxxx	xxxxx	103	177	607	131	179	491
Level Of Service Module:												
Unused Cap.:	577	xxxx	xxxxx	452	xxxx	xxxxx	101	170	545	124	167	375
LOS by Move:	A	A	A	A	A	A	D	D	A	D	D	B
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	440	xxxxx	xxxx	380	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	369	xxxxx	xxxx	245	xxxxx
Shared LOS:	A	A	A	A	A	A	A	B	A	A	C	A

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #2 Clark Road and Skyway

Level Of Service: D												
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0 0	0	0	1! 0 0	0	0	0 0 0	0	0	1! 0 0
Volume Module:												
Initial Vol:	1	351	22	150	228	2	0	0	0	14	0	363
Grade:	0%			0%			0%			0%		
Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Truck/Combi:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	1	386	24	165	251	2	0	0	0	15	0	399
Critical Gap Module:												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0	xxxx	xxxxxx	5.0	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	6.5	6.0	5.5
Capacity Module:												
Conflict Vol:	253	xxxx	xxxxxx	410	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	817	817	422
Potent Cap.:	788	xxxx	xxxxxx	657	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	310	343	604
% Used Cap.:	0.1	xxxx	xxxxxx	25.1	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	5.0	0.0	66.1
Impedance:	1.00	xxxx	xxxxxx	0.80	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	1.00	0.41
Actual Cap.:	788	xxxx	xxxxxx	657	xxxx	xxxxxx	xxxx	xxxx	100000	248	274	604
Level Of Service Module:												
Unused Cap.:	787	xxxx	xxxxxx	492	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	232	274	204
LOS by Move:	A	A	A	A	A	A	*	*	*	C	C	C
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	573	xxxxxx
Unused Cap.:	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	158	xxxxxx
Shared LOS:	A	A	A	A	A	A	*	*	*	A	D	A

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #3 Skyway and Rock Lane

Level Of Service: A												
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 1! 0 0			0 0 0 0 0			0 0 1! 0 0		
Volume Module:												
Initial Vol:	0 437 14			24 275 0			0 0 0			7 0 21		
Grade:	0%			0%			0%			0%		
Cycle/Cars:	xxxx xxxx			xxxx xxxx			xxxx xxxx			xxxx xxxx		
Truck/Combi:	xxxx xxxx			xxxx xxxx			xxxx xxxx			xxxx xxxx		
Adjustment:	1.00 1.00 1.00			1.00 1.00 1.00			1.00 1.00 1.00			1.00 1.00 1.00		
Final Vol.:	0 481 15			26 303 0			0 0 0			8 0 23		
Critical Gap Module:												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0 xxxx xxxxx			5.0 xxxx xxxxx			xxxx xxxx xxxxx			6.5 6.0 5.5		
Capacity Module:												
Cnflct Vol:	303 xxxx xxxxx			496 xxxx xxxxx			xxxx xxxx xxxxx			817 817 504		
Potent Cap.:	744 xxxx xxxxx			596 xxxx xxxxx			xxxx xxxx xxxxx			310 343 548		
% Used Cap.:	0.0 xxxx xxxxx			4.4 xxxx xxxxx			xxxx xxxx xxxxx			2.5 0.0 4.2		
Impedance:	1.00 xxxx xxxxx			0.96 xxxx xxxxx			xxxx xxxx xxxxx			xxxx 1.00 0.97		
Actual Cap.:	744 xxxx xxxxx			596 xxxx xxxxx			xxxx xxxx100000			299 331 548		
Level Of Service Module:												
Unused Cap.:	744 xxxx xxxxx			569 xxxx xxxxx			xxxx xxxx xxxxx			292 331 524		
LOS by Move:	A A A			A A A			* * *			C B A		
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx xxxx xxxxx			xxxx xxxx xxxxx			xxxx xxxx xxxxx			xxxx 453 xxxxx		
Unused Cap.:	xxxx xxxx xxxxx			xxxx xxxx xxxxx			xxxx xxxx xxxxx			xxxx 423 xxxxx		
Shared LOS:	A A A			A A A			* * *			A A A		

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
4-Way Stop Method

* Base Volume Alternative *

Intersection #4 Skyway and Wagstaff Road

Cycle (sec):	1	Critical Vol./Cap. (X):	0.95
Loss Time (sec):	0	Average Delay (sec/vehicle):	23.9
Optimal Cycle:	0	Level Of Service:	D

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Stop Sign	Stop Sign	Stop Sign	Stop Sign
Rights:	Include	Include	Include	Include
Lanes:	0 0 1! 0 0	0 0 1! 0 0	0 0 1! 0 0	0 0 1! 0 0
Volume Module:				
Initial Vol:	40 468 174	39 208 20	33 46 20	85 56 39
Grade:	0%	0%	0%	0%
Cycle/Cars:	xxxx xxxx	xxxx xxxx	xxxx xxxx	xxxx xxxx
Truck/Combi:	xxxx xxxx	xxxx xxxx	xxxx xxxx	xxxx xxxx
Adjustment:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
Final Vol.:	40 468 174	39 208 20	33 46 20	85 56 39
Saturation Flow Module:				
Sat/Lane:	1800 1800 1800	1800 1800 1800	1800 1800 1800	1800 1800 1800
Adjustment:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
Lanes:	0.06 0.69 0.26	0.15 0.78 0.07	0.33 0.46 0.20	0.47 0.31 0.22
Final Sat.:	42 491 182	99 527 51	74 103 45	132 87 61
Capacity Analysis Module:				
Vol/Sat:	0.95 0.95 0.95	0.39 0.39 0.39	0.45 0.45 0.45	0.64 0.64 0.64
Crit Moves:	****	****	****	****
Green/Cycle:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
Volume/Cap:	0.95 0.95 0.95	0.39 0.39 0.39	0.45 0.45 0.45	0.64 0.64 0.64
Level Of Service Module:				
Delay/Veh:	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0
Delay Adj:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
AdjDel/Veh:	37.5 37.5 37.5	4.5 4.5 4.5	5.5 5.5 5.5	11.5 11.5 11.5
Queue:	xxxx xxxx xxxxx	xxxx xxxx xxxxx	xxxx xxxx xxxxx	xxxx xxxx xxxxx

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
Circular 212 Planning Method

* Base Volume Alternative *

Intersection #5 Skyway and Bille Road

Cycle (sec):	100	Critical Vol./Cap. (X):	0.52
Loss Time (sec):	0	Average Delay (sec/vehicle):	17.4
Optimal Cycle:	30	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	No Left Phase			No Left Phase			No Left Phase			No Left Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	1	1	0	1	0	1	0	1	0	1
Volume Module:												
Initial Vol:	91	593	216	58	385	25	27	49	83	191	52	23
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	91	593	216	58	385	25	27	49	83	191	52	23
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.47	0.53	1.00	0.94	0.06	0.39	0.61	1.00	1.00	0.69	0.31
Final Sat.:	1500	2199	801	1500	1409	91	589	911	1500	1500	1040	460
Capacity Analysis Module:												
Vol/Sat:	0.06	0.27	0.27	0.04	0.27	0.27	0.05	0.05	0.06	0.13	0.05	0.05
Crit Moves:	****			****			****			****		
Green/Cycle:	0.12	0.57	0.57	0.08	0.53	0.53	0.17	0.11	0.11	0.25	0.18	0.18
Volume/Cap:	0.52	0.48	0.48	0.48	0.52	0.52	0.27	0.50	0.52	0.52	0.27	0.27
Level Of Service Module:												
Delay/Veh:	34.1	10.2	10.6	36.1	12.3	18.8	28.2	35.8	34.8	26.1	27.2	27.4
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.1	10.2	10.6	36.1	12.3	18.8	28.2	35.8	34.8	26.1	27.2	27.4
Queue:	3	10	4	2	7	1	1	1	2	5	1	1

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
Circular 212 Planning Method

* Base Volume Alternative *

Intersection #6 Skyway and Maxwell Road

Cycle (sec):	100	Critical Vol./Cap. (X):	0.45
Loss Time (sec):	0	Average Delay (sec/vehicle):	6.0
Optimal Cycle:	42	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Left Phase			Left Phase			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	1	1	0	1	0	0	0	0	1	0
Volume Module:												
Initial Vol:	0	877	54	54	529	0	0	0	0	31	0	75
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	877	54	54	529	0	0	0	0	31	0	75
Saturation Flow Module:												
Sat/Lane:	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.88	0.12	1.00	2.00	0.00	0.00	0.00	0.00	0.29	0.00	0.71
Final Sat.:	1375	2590	160	1375	2750	0	0	0	0	402	0	973
Capacity Analysis Module:												
Vol/Sat:	0.00	0.34	0.34	0.04	0.19	0.00	0.00	0.00	0.00	0.08	0.00	0.08
Crit Moves:	****			****			****			****		
Green/Cycle:	0.00	0.74	0.74	0.09	0.83	0.83	0.00	0.00	0.00	0.17	0.17	0.17
Volume/Cap:	0.00	0.45	0.45	0.45	0.23	0.00	0.00	0.00	0.00	0.45	0.00	0.45
Level Of Service Module:												
Delay/Veh:	0.0	3.9	5.7	35.4	1.4	0.0	0.0	0.0	0.0	32.0	0.0	30.2
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	3.9	5.7	35.4	1.4	0.0	0.0	0.0	0.0	32.0	0.0	30.2
Queue:	0	10	1	2	3	0	0	0	0	1	0	2

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
Circular 212 Planning Method

* Base Volume Alternative *

Intersection #7 Skyway and Oliver Road

Cycle (sec):	100	Critical Vol./Cap. (X):	0.48
Loss Time (sec):	0	Average Delay (sec/vehicle):	12.0
Optimal Cycle:	44	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Left Phase			Left Phase			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	1	1	0	1	0	0	1	0	0	1
Volume Module:												
Initial Vol:	151	831	43	16	599	81	51	14	81	21	5	9
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	151	831	43	16	599	81	51	14	81	21	5	9
Saturation Flow Module:												
Sat/Lane:	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.90	0.10	1.00	1.76	0.24	0.35	0.10	0.55	1.00	0.36	0.64
Final Sat.:	1375	2615	135	1375	2422	328	480	132	763	1375	491	884
Capacity Analysis Module:												
Vol/Sat:	0.11	0.32	0.32	0.01	0.25	0.25	0.11	0.11	0.11	0.02	0.01	0.01
Crit Moves:	****			****			****			****		
Green/Cycle:	0.23	0.72	0.72	0.03	0.52	0.52	0.22	0.22	0.22	0.03	0.03	0.03
Volume/Cap:	0.48	0.44	0.44	0.44	0.48	0.48	0.48	0.48	0.48	0.48	0.32	0.32
Level Of Service Module:												
Delay/Veh:	26.6	4.5	6.5	42.1	12.2	13.6	28.7	34.4	27.7	42.5	40.1	38.6
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.6	4.5	6.5	42.1	12.2	13.6	28.7	34.4	27.7	42.5	40.1	38.6
Queue:	4	10	1	1	11	2	1	0	2	1	0	0

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
Circular 212 Planning Method

* Base Volume Alternative *

Intersection #8 Skyway and Elliot Road

Cycle (sec):	100	Critical Vol./Cap. (X):	0.62
Loss Time (sec):	0	Average Delay (sec/vehicle):	14.1
Optimal Cycle:	38	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	No Left Phase			No Left Phase			No Left Phase			No Left Phase		
Rights:	Include			Include			Include			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	1	1	0	1	0	0	1	0	0	1
Volume Module:												
Initial Vol:	40	795	228	167	541	9	15	34	17	129	36	220
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Final Vol.:	40	795	228	167	541	9	15	34	17	129	36	0
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.55	0.45	1.00	1.97	0.03	0.23	0.52	0.26	0.80	0.20	1.00
Final Sat.:	1500	2331	669	1500	2951	49	341	773	386	1199	301	1500
Capacity Analysis Module:												
Vol/Sat:	0.03	0.34	0.34	0.11	0.18	0.18	0.04	0.04	0.04	0.11	0.12	0.00
Crit Moves:	****			****			****			****		
Green/Cycle:	0.09	0.55	0.55	0.18	0.64	0.64	0.07	0.08	0.08	0.19	0.19	1.00
Volume/Cap:	0.29	0.62	0.62	0.62	0.29	0.29	0.62	0.57	0.57	0.57	0.62	0.00
Level Of Service Module:												
Delay/Veh:	32.8	12.3	13.8	32.0	6.1	7.4	58.3	42.8	49.5	30.9	40.1	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	32.8	12.3	13.8	32.0	6.1	7.4	58.3	42.8	49.5	30.9	40.1	0.0
Queue:	1	15	5	5	7	0	1	1	1	3	1	0

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #9 Skyway and Honey Run Road

Level Of Service: E												
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0	1	0 1 0	0	1	0 1 0	0	0	1 1 0	0	0	1 1 0 0
Volume Module:												
Initial Vol:	21	975	6	12	545	26	33	2	31	3	1	7
Grade:	0%			0%			0%			0%		
Cycle/Cars:	xxxx xxxx			xxxx xxxx			xxxx xxxx			xxxx xxxx		
Truck/Combi:	xxxx xxxx			xxxx xxxx			xxxx xxxx			xxxx xxxx		
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	23	1073	7	13	600	29	36	2	34	3	1	8
Critical Gap Module:												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.5	xxxx	xxxxx	5.5	xxxx	xxxxx	7.0	6.5	5.5	7.0	6.5	5.5
Capacity Module:												
Cnflct Vol:	628	xxxx	xxxxx	1079	xxxx	xxxxx	1731	1729	328	1748	1740	543
Potent Cap.:	472	xxxx	xxxxx	275	xxxx	xxxxx	82	95	676	81	93	522
% Used Cap.:	4.9	xxxx	xxxxx	4.8	xxxx	xxxxx	44.0	2.3	5.0	4.1	1.2	1.5
Impedance:	0.96	xxxx	xxxxx	0.96	xxxx	xxxxx	xxxx	0.98	0.96	xxxx	0.99	0.99
Actual Cap.:	472	xxxx	xxxxx	275	xxxx	xxxxx	75	88	676	70	86	522
Level Of Service Module:												
Unused Cap.:	449	xxxx	xxxxx	261	xxxx	xxxxx	38	85	642	67	85	515
LOS by Move:	A	A	A	C	A	A	E	E	A	E	E	A
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	129	xxxxx	xxxx	162	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	57	xxxxx	xxxx	150	xxxxx
Shared LOS:	A	A	A	A	A	A	A	E	A	A	D	A

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
Circular 212 Planning Method

* Base Volume Alternative *

Intersection #10 Skyway and Pearson Road

Cycle (sec):	100	Critical Vol./Cap. (X):	0.71
Loss Time (sec):	0	Average Delay (sec/vehicle):	15.6
Optimal Cycle:	80	Level Of Service:	C

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Left Phase	Left Phase	Split Phase	Split Phase
Rights:	Include	Include	Include	Include
Min. Green:	0 0 0	0 0 0	0 0 0	0 0 0
Lanes:	0 1 0 1 0	1 0 1 1 0	0 0 0 0 0	1 0 0 0 1

Volume Module:	North Bound			South Bound			East Bound			West Bound		
Initial Vol:	0	860	252	156	538	0	0	0	270	0	97	
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Final Vol.:	0	860	252	156	538	0	0	0	270	0	97	

Saturation Flow Module:	North Bound			South Bound			East Bound			West Bound		
Sat/Lane:	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375	
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Lanes:	0.00	1.55	0.45	1.00	2.00	0.00	0.00	0.00	0.00	1.00	0.00	
Final Sat.:	0	2127	623	1375	2750	0	0	0	0	1375	0	

Capacity Analysis Module:	North Bound			South Bound			East Bound			West Bound		
Vol/Sat:	0.00	0.40	0.40	0.11	0.20	0.00	0.00	0.00	0.00	0.20	0.00	
Crit Moves:	****			****			****			****		
Green/Cycle:	0.00	0.57	0.57	0.16	0.73	0.73	0.00	0.00	0.00	0.27	0.27	
Volume/Cap:	0.00	0.71	0.71	0.71	0.27	0.00	0.00	0.00	0.00	0.71	0.26	

Level Of Service Module:	North Bound			South Bound			East Bound			West Bound		
Delay/Veh:	0.0	13.6	16.8	37.8	3.6	0.0	0.0	0.0	0.0	29.5	0.0	
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
AdjDel/Veh:	0.0	13.6	16.8	37.8	3.6	0.0	0.0	0.0	0.0	29.5	0.0	
Queue:	0	18	6	5	5	0	0	0	0	7	0	

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #11 Skyway and Neal Road

Level Of Service: E											
Approach:	North Bound			South Bound			East Bound			West Bound	
Movement:	L - T - R			L - T - R			L - T - R			L - T - R	
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign	
Rights:	Include			Include			Include			Include	
Lanes:	0	0	1	0	0		0	0	1	0	0
Volume Module:											
Initial Vol:	7	896	40	115	468	18	13	2	4	40	0
Grade:	0%			0%			0%			0%	
Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx
Truck/Combi:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	8	986	44	127	515	20	14	2	4	44	0
Critical Gap Module:											
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg	
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	6.5	6.0
Capacity Module:											
Conflict Vol:	535	xxxx	xxxxx	1030	xxxx	xxxxx	1781	1689	545	1683	1676
Potent Cap.:	570	xxxx	xxxxx	322	xxxx	xxxxx	89	116	521	101	117
% Used Cap.:	1.4	xxxx	xxxxx	39.2	xxxx	xxxxx	16.1	1.9	0.8	43.7	0.0
Impedance:	0.99	xxxx	xxxxx	0.69	xxxx	xxxxx	xxxx	0.98	0.99	xxxx	1.00
Actual Cap.:	570	xxxx	xxxxx	322	xxxx	xxxxx	45	78	521	67	80
Level Of Service Module:											
Unused Cap.:	562	xxxx	xxxxx	196	xxxx	xxxxx	30	76	517	23	80
LOS by Move:	A	A	A	D	A	A	E	E	A	E	E
Movement:											
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	58	xxxxx	xxxx	139
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	38	xxxxx	xxxx	2
Shared LOS:	A	A	A	A	A	A	A	E	A	A	E

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
Circular 212 Planning Method

* Base Volume Alternative *

Intersection #12 Clark Road and Wagstaff Road

Cycle (sec):	100	Critical Vol./Cap. (X):	0.39
Loss Time (sec):	0	Average Delay (sec/vehicle):	18.6
Optimal Cycle:	37	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Left Phase			Left Phase			Left Phase			Left Phase		
Rights:	Include			Include			Ignore			Ignore		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	1	1	0	1	1	0	1	1	0	1
Volume Module:												
Initial Vol:	118	347	122	76	336	44	59	120	99	108	67	56
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Vol.:	118	347	122	76	336	44	59	120	0	108	67	0
Saturation Flow Module:												
Sat/Lane:	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.48	0.52	1.00	1.77	0.23	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	1375	2035	715	1375	2432	318	1375	1375	1375	1375	1375	1375
Capacity Analysis Module:												
Vol/Sat:	0.09	0.17	0.17	0.06	0.14	0.14	0.04	0.09	0.00	0.08	0.05	0.00
Crit Moves:	****			****			****			****		
Green/Cycle:	0.22	0.44	0.44	0.14	0.36	0.36	0.20	0.22	1.00	0.20	0.23	1.00
Volume/Cap:	0.39	0.39	0.39	0.39	0.39	0.39	0.22	0.39	0.00	0.39	0.22	0.00
Level Of Service Module:												
Delay/Veh:	26.0	14.9	15.2	30.8	18.7	19.7	25.9	25.9	0.0	27.2	24.4	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.0	14.9	15.2	30.8	18.7	19.7	25.9	25.9	0.0	27.2	24.4	0.0
Queue:	3	7	2	2	7	1	1	3	0	3	2	0

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
Circular 212 Planning Method

* Base Volume Alternative *

Intersection #13 Clark Road and Bille Road

Cycle (sec):	100	Critical Vol./Cap. (X):	0.51
Loss Time (sec):	0	Average Delay (sec/vehicle):	14.9
Optimal Cycle:	29	Level Of Service:	A

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	No Left Phase	No Left Phase	No Left Phase	No Left Phase
Rights:	Include	Include	Ignore	Ignore
Min. Green:	0 0 0	0 0 0	0 0 0	0 0 0
Lanes:	1 0 1 1 0	1 0 1 1 0	1 0 1 0 1	1 0 1 0 1

Volume Module:	North Bound			South Bound			East Bound			West Bound		
Initial Vol:	94	826	89	89	502	77	133	104	80	102	84	71
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Final Vol.:	94	826	89	89	502	77	133	104	0	102	84	0

Saturation Flow Module:	North Bound			South Bound			East Bound			West Bound		
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.81	0.19	1.00	1.73	0.27	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	1500	2708	292	1500	2601	399	1500	1500	1500	1500	1500	1500

Capacity Analysis Module:	North Bound			South Bound			East Bound			West Bound		
Vol/Sat:	0.06	0.30	0.31	0.06	0.19	0.19	0.09	0.07	0.00	0.07	0.06	0.00
Crit Moves:			****			****			****			****
Green/Cycle:	0.18	0.60	0.60	0.12	0.54	0.54	0.17	0.14	1.00	0.14	0.11	1.00
Volume/Cap:	0.36	0.51	0.51	0.51	0.36	0.36	0.51	0.48	0.00	0.48	0.51	0.00

Level Of Service Module:	North Bound			South Bound			East Bound			West Bound		
Delay/Veh:	28.3	9.1	10.9	34.0	10.1	10.5	30.2	31.7	0.0	31.9	34.5	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	28.3	9.1	10.9	34.0	10.1	10.5	30.2	31.7	0.0	31.9	34.5	0.0
Queue:	2	13	2	2	8	1	3	3	0	3	2	0

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
Circular 212 Planning Method

* Base Volume Alternative *

Intersection #14 Clark Road and Central Park

Cycle (sec):	100	Critical Vol./Cap. (X):	0.39									
Loss Time (sec):	0	Average Delay (sec/vehicle):	7.4									
Optimal Cycle:	37	Level Of Service:	A									

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Left Phase			Left Phase			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	1 1 0	1	0	1 1 0	0	0	1! 0 0	0	0	1! 0 0

Volume Module:												
Initial Vol:	43	771	2	12	674	42	69	1	61	0	0	0
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	43	771	2	12	674	42	69	1	61	0	0	0

Saturation Flow Module:												
Sat/Lane:	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.99	0.01	1.00	1.88	0.12	0.53	0.01	0.47	0.00	1.00	0.00
Final Sat.:	1375	2743	7	1375	2589	161	724	10	640	0	1375	0

Capacity Analysis Module:												
Vol/Sat:	0.03	0.28	0.28	0.01	0.26	0.26	0.10	0.10	0.10	0.00	0.00	0.00
Crit Moves:	****					****			****			****
Green/Cycle:	0.08	0.73	0.73	0.02	0.67	0.67	0.25	0.25	0.25	0.00	0.00	0.00
Volume/Cap:	0.39	0.38	0.38	0.38	0.39	0.39	0.39	0.39	0.39	0.00	0.00	0.00

Level Of Service Module:												
Delay/Veh:	34.7	3.9	20.1	40.8	5.6	6.7	24.9	51.4	25.0	0.0	0.0	0.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.7	3.9	20.1	40.8	5.6	6.7	24.9	51.4	25.0	0.0	0.0	0.0
Queue:	1	8	0	0	8	1	2	0	1	0	0	0

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
Circular 212 Planning Method

* Base Volume Alternative *

Intersection #15 Clark Road and Elliot Road

Cycle (sec):	100	Critical Vol./Cap. (X):	0.67
Loss Time (sec):	0	Average Delay (sec/vehicle):	26.2
Optimal Cycle:	43	Level Of Service:	B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	No Left Phase			No Left Phase			No Left Phase			No Left Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	1	1	0	1	1	0	1	0	1	0
Volume Module:												
Initial Vol:	181	576	47	299	420	121	203	156	145	88	121	39
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	181	576	47	299	420	121	203	156	145	88	121	39
Saturation Flow Module:												
Sat/Lane:	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.85	0.15	1.00	1.55	0.45	1.00	0.52	0.48	1.00	0.76	0.24
Final Sat.:	1500	2774	226	1500	2329	671	1500	777	723	1500	1134	366
Capacity Analysis Module:												
Vol/Sat:	0.12	0.21	0.21	0.20	0.18	0.18	0.14	0.20	0.20	0.06	0.11	0.11
Crit Moves:	****			****			****			****		
Green/Cycle:	0.24	0.31	0.31	0.30	0.37	0.37	0.22	0.30	0.30	0.09	0.17	0.17
Volume/Cap:	0.49	0.67	0.67	0.67	0.49	0.49	0.62	0.67	0.67	0.67	0.62	0.62
Level Of Service Module:												
Delay/Veh:	25.8	24.4	36.8	26.2	19.3	20.2	29.8	28.3	28.7	42.1	33.8	41.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	25.8	24.4	36.8	26.2	19.3	20.2	29.8	28.3	28.7	42.1	33.8	41.0
Queue:	4	14	1	8	9	3	5	4	4	3	3	1

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
Circular 212 Planning Method

* Base Volume Alternative *

Intersection #16 Clark Road and Munneley Road

Cycle (sec):	100	Critical Vol./Cap. (X):	0.43
Loss Time (sec):	0	Average Delay (sec/vehicle):	8.3
Optimal Cycle:	33	Level Of Service:	A

Approach:	North Bound	South Bound	East Bound	West Bound
Movement:	L - T - R	L - T - R	L - T - R	L - T - R
Control:	Left Phase	Left Phase	No Left Phase	No Left Phase
Rights:	Include	Include	Include	Include
Min. Green:	0 0 0	0 0 0	0 0 0	0 0 0
Lanes:	1 0 1 1 0	1 0 1 1 0	0 0 1! 0 0	0 0 1! 0 0

Volume Module:

Initial Vol:	3 729 120	36 523 27	32 12 8	55 7 43
Adjustment:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
Final Vol.:	3 729 120	36 523 27	32 12 8	55 7 43

Saturation Flow Module:

Sat/Lane:	1425 1425 1425	1425 1425 1425	1425 1425 1425	1425 1425 1425
Adjustment:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
Lanes:	1.00 1.72 0.28	1.00 1.90 0.10	0.62 0.23 0.15	0.52 0.07 0.41
Final Sat.:	1425 2447 403	1425 2710 140	877 329 219	746 95 584

Capacity Analysis Module:

Vol/Sat:	0.00 0.30 0.30	0.03 0.19 0.19	0.04 0.04 0.04	0.07 0.07 0.07
Crit Moves:	****	****	****	****
Green/Cycle:	0.01 0.69 0.69	0.06 0.74 0.74	0.08 0.08 0.08	0.17 0.17 0.17
Volume/Cap:	0.26 0.43 0.43	0.43 0.26 0.26	0.43 0.43 0.43	0.43 0.43 0.43

Level Of Service Module:

Delay/Veh:	40.5 5.5 6.1	37.3 3.3 3.6	36.0 39.7 42.2	30.1 38.4 30.5
Delay Adj:	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00	1.00 1.00 1.00
AdjDel/Veh:	40.5 5.5 6.1	37.3 3.3 3.6	36.0 39.7 42.2	30.1 38.4 30.5
Queue:	0 9 2	1 5 0	1 0 0	1 0 1

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
Circular 212 Planning Method

* Base Volume Alternative *

Intersection #17 Clark Road and Pearson Road

Cycle (sec):	100	Critical Vol./Cap. (X):	0.59
Loss Time (sec):	0	Average Delay (sec/vehicle):	24.9
Optimal Cycle:	56	Level Of Service:	A

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Left Phase			Left Phase			Left Phase			Left Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	1	1	0	1	1	0	1	1	0	1
Volume Module:												
Initial Vol:	142	351	40	117	196	207	356	209	26	46	126	93
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	142	351	40	117	196	207	356	209	26	46	126	93
Saturation Flow Module:												
Sat/Lane:	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375	1375
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	1.80	0.20	1.00	1.00	1.00	1.00	1.78	0.22	1.00	1.15	0.85
Final Sat.:	1375	2469	281	1375	1375	1375	1375	2446	304	1375	1582	1168
Capacity Analysis Module:												
Vol/Sat:	0.10	0.14	0.14	0.09	0.14	0.15	0.26	0.09	0.09	0.03	0.08	0.08
Crit Moves:	****			****			****			****		
Green/Cycle:	0.17	0.27	0.27	0.16	0.25	0.25	0.44	0.41	0.41	0.16	0.13	0.13
Volume/Cap:	0.59	0.53	0.53	0.53	0.56	0.59	0.59	0.21	0.21	0.21	0.59	0.59
Level Of Service Module:												
Delay/Veh:	32.1	24.7	29.3	31.6	26.5	27.2	17.6	14.6	14.7	28.1	34.5	35.5
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	32.1	24.7	29.3	31.6	26.5	27.2	17.6	14.6	14.7	28.1	34.5	35.5
Queue:	4	8	1	3	5	5	8	4	0	1	4	3

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #18 Clark Road and Buschmann Road

Level Of Service: C											
Approach:	North Bound			South Bound			East Bound			West Bound	
Movement:	L - T - R			L - T - R			L - T - R			L - T - R	
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign	
Rights:	Include			Include			Include			Include	
Lanes:	0	0	1! 0 0	0	0	1! 0 0	0	0	1! 0 0	0	0 0 0 0 0
Volume Module:											
Initial Vol:	27	326	0	0	227	91	100	0	38	0	0 0 0
Grade:	0%			0%			0%			0%	
Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx
Truck/Combi:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00 1.00 1.00
Final Vol.:	30	359	0	0	250	100	110	0	42	0	0 0 0
Critical Gap Module:											
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg	
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	xxxx	xxxx xxxxx
Capacity Module:											
Chflict Vol:	350	xxxx	xxxxx	359	xxxx	xxxxx	688	688	400	xxxx	xxxx xxxxx
Potent Cap.:	705	xxxx	xxxxx	698	xxxx	xxxxx	367	403	620	xxxx	xxxx xxxxx
% Used Cap.:	4.2	xxxx	xxxxx	0.0	xxxx	xxxxx	30.0	0.0	6.7	xxxx	xxxx xxxxx
Impedance:	0.97	xxxx	xxxxx	1.00	xxxx	xxxxx	xxxx	1.00	0.95	xxxx	xxxx xxxxx
Actual Cap.:	705	xxxx	xxxxx	698	xxxx	xxxxx	355	390	620	xxxx	xxxx100000
Level Of Service Module:											
Unused Cap.:	675	xxxx	xxxxx	698	xxxx	xxxxx	245	390	578	xxxx	xxxx xxxxx
LOS by Move:	A	A	A	A	A	A	C	B	A	*	* *
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT	
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	402	xxxxx	xxxx	xxxx xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	250	xxxxx	xxxx	xxxx xxxxx
Shared LOS:	A	A	A	A	A	A	A	C	A	*	* *

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #19 Pentz Road and Wagstaff Road

Level Of Service:

C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Controls:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0 0	0	0	1! 0 0	0	0	1! 0 0	0	0	1! 0 0
Volume Module:												
Initial Vol:	93	133	1	1	111	95	151	6	95	2	4	0
Grade:	0%			0%			0%			0%		
Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Truck/Combi:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	102	146	1	1	122	105	166	7	105	2	4	0
Critical Gap Module:												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0	xxxx	xxxxxx	5.0	xxxx	xxxxxx	6.5	6.0	5.5	6.5	6.0	5.5
Capacity Module:												
Cnflct Vol:	227	xxxx	xxxxxx	147	xxxx	xxxxxx	430	425	279	588	477	148
Potent Cap.:	812	xxxx	xxxxxx	889	xxxx	xxxxxx	514	560	717	418	525	839
% Used Cap.:	12.6	xxxx	xxxxxx	0.1	xxxx	xxxxxx	32.3	1.2	14.6	0.5	0.8	0.0
Impedance:	0.90	xxxx	xxxxxx	1.00	xxxx	xxxxxx	xxxx	0.99	0.88	xxxx	0.99	1.00
Actual Cap.:	812	xxxx	xxxxxx	889	xxxx	xxxxxx	458	503	717	329	472	839
Level Of Service Module:												
Unused Cap.:	710	xxxx	xxxxxx	888	xxxx	xxxxxx	292	497	613	326	467	839
LOS by Move:	A	A	A	A	A	A	C	A	A	B	A	A
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	532	xxxxxx	xxxx	412	xxxxxx
Unused Cap.:	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	255	xxxxxx	xxxx	405	xxxxxx
Shared LOS:	A	A	A	A	A	A	A	C	A	A	A	A

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #20 Pentz Road and Bille Road

Level Of Service: B														
Approach:	North Bound			South Bound			East Bound			West Bound				
Movement:	L - T - R			L - T - R			L - T - R			L - T - R				
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign				
Rights:	Include			Include			Include			Include				
Lanes:	1	0	1	0	0	0	0	0	1	0	0	0	0	0
Volume Module:														
Initial Vol:	105	121	0	0	122	99	91	0	77	0	0	0	0	0
Grade:	0%			0%			0%			0%				
Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx			
Truck/Combi:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx			
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Final Vol.:	116	133	0	0	134	109	100	0	85	0	0	0		
Critical Gap Module:														
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg				
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	xxxx	xxxx	xxxxx		
Capacity Module:														
Cnflct Vol:	243	xxxx	xxxxx	133	xxxx	xxxxx	437	437	298	xxxx	xxxx	xxxxx		
Potent Cap.:	797	xxxx	xxxxx	904	xxxx	xxxxx	509	552	701	xxxx	xxxx	xxxxx		
% Used Cap.:	14.5	xxxx	xxxxx	0.0	xxxx	xxxxx	19.7	0.0	12.1	xxxx	xxxx	xxxxx		
Impedance:	0.88	xxxx	xxxxx	1.00	xxxx	xxxxx	xxxx	1.00	0.90	xxxx	xxxx	xxxxx		
Actual Cap.:	797	xxxx	xxxxx	904	xxxx	xxxxx	450	488	701	xxxx	xxxx	100000		
Level Of Service Module:														
Unused Cap.:	681	xxxx	xxxxx	904	xxxx	xxxxx	349	488	617	xxxx	xxxx	xxxxx		
LOS by Move:	A	A	A	A	A	A	B	A	A	*	*	*		
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT				
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	538	xxxxx	xxxx	xxxx	xxxxx		
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	353	xxxxx	xxxx	xxxx	xxxxx		
Shared LOS:	A	A	A	A	A	A	A	B	A	*	*	*		

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #21 Pentz Road and Pearson Road

Level Of Service:

B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1	0	0	0	0	0	1	0	0	0
Volume Module:												
Initial Vol:	102	94	0	0	100	91	74	0	167	0	0	0
Grade:	0%			0%			0%			0%		
Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Truck/Combi:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	112	103	0	0	110	100	81	0	184	0	0	0
Critical Gap Module:												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	xxxx	xxxx	xxxxx
Capacity Module:												
Chflict Vol:	210	xxxx	xxxxx	103	xxxx	xxxxx	376	376	260	xxxx	xxxx	xxxxx
Potent Cap.:	827	xxxx	xxxxx	936	xxxx	xxxxx	551	596	733	xxxx	xxxx	xxxxx
% Used Cap.:	13.6	xxxx	xxxxx	0.0	xxxx	xxxxx	14.8	0.0	25.0	xxxx	xxxx	xxxxx
Impedance:	0.89	xxxx	xxxxx	1.00	xxxx	xxxxx	xxxx	1.00	0.80	xxxx	xxxx	xxxxx
Actual Cap.:	827	xxxx	xxxxx	936	xxxx	xxxxx	491	531	733	xxxx	xxxx	100000
Level Of Service Module:												
Unused Cap.:	715	xxxx	xxxxx	936	xxxx	xxxxx	410	531	550	xxxx	xxxx	xxxxx
LOS by Move:	A	A	A	A	A	A	A	A	A	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	637	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	372	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	A	A	A	A	A	A	A	B	A	*	*	*

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #22 Pentz Road and Stearns Road

Level Of Service: A												
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0 0	0	0	1! 0 0	0	0	1! 0 0	0	0	1! 0 0
Volume Module:												
Initial Vol:	7	170	5	30	136	36	25	7	16	3	2	36
Grade:	0%			0%			0%			0%		
Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	8	187	6	33	150	40	28	8	18	3	2	40
Critical Gap Module:												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx	6.5	6.0	5.5	6.5	6.0	5.5
Capacity Module:												
Cnflict Vol:	189	xxxx	xxxxx	193	xxxx	xxxxx	444	403	209	445	420	195
Potent Cap.:	848	xxxx	xxxxx	844	xxxx	xxxxx	504	576	780	503	564	793
% Used Cap.:	0.9	xxxx	xxxxx	3.9	xxxx	xxxxx	5.5	1.3	2.3	0.7	0.4	5.0
Impedance:	0.99	xxxx	xxxxx	0.97	xxxx	xxxxx	xxxx	0.99	0.98	xxxx	1.00	0.96
Actual Cap.:	848	xxxx	xxxxx	844	xxxx	xxxxx	464	554	780	470	543	793
Level Of Service Module:												
Unused Cap.:	840	xxxx	xxxxx	811	xxxx	xxxxx	436	547	762	467	540	753
LOS by Move:	A	A	A	A	A	A	A	A	A	A	A	A
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	551	xxxxx	xxxx	739	xxxxx
Unused Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	499	xxxxx	xxxx	694	xxxxx
Shared LOS:	A	A	A	A	A	A	A	A	A	A	A	A

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #26 Elliot Road and Maxwell Drive

Level Of Service: E											
Approach:	North Bound			South Bound			East Bound			West Bound	
Movement:	L - T - R			L - T - R			L - T - R			L - T - R	
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled	
Rights:	Include			Include			Include			Include	
Lanes:	0	0	1! 0 0	0	0	1! 0 0	0	0	1! 0 0	0	0 1! 0 0
Volume Module:											
Initial Vol:	2	0	5	95	0	128	51	414	1	9	377 59
Grade:	0%			0%			0%			0%	
Cycle/Cars:	xxxx xxxx			xxxx xxxx			xxxx xxxx			xxxx xxxx	
Truck/Combi:	xxxx xxxx			xxxx xxxx			xxxx xxxx			xxxx xxxx	
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00 1.00
Final Vol.:	2	0	6	105	0	141	56	455	1	10	415 65
Critical Gap Module:											
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg	
Critical Gp:	6.5	6.0	5.5	6.5	6.0	5.5	5.0	xxxx	xxxxxx	5.0	xxxx xxxxxx
Capacity Module:											
Conflict Vol:	1142	1002	457	975	970	512	480	xxxx	xxxxxx	457	xxxx xxxxxx
Potent Cap.:	203	273	579	253	284	542	607	xxxx	xxxxxx	623	xxxx xxxxxx
% Used Cap.:	1.1	0.0	0.9	41.3	0.0	26.0	9.2	xxxx	xxxxxx	1.6	xxxx xxxxxx
Impedance:	xxxx	1.00	0.99	xxxx	1.00	0.79	0.93	xxxx	xxxxxx	0.99	xxxx xxxxxx
Actual Cap.:	147	249	579	229	259	542	607	xxxx	xxxxxx	623	xxxx xxxxxx
Level Of Service Module:											
Unused Cap.:	145	249	574	125	259	401	551	xxxx	xxxxxx	613	xxxx xxxxxx
LOS by Move:	D	C	A	D	C	A	A	A	A	A	A A A
Movement:											
Shared Cap.:	xxxx	315	xxxxx	xxxx	343	xxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx xxxxxx
Unused Cap.:	xxxx	307	xxxxx	xxxx	98	xxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx xxxxxx
Shared LOS:	A	B	A	A	E	A	A	A	A	A	A A A

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #27 Pearson Road and Scottwood Road

Level Of Service: D											
Approach:	North Bound			South Bound			East Bound			West Bound	
Movement:	L - T - R			L - T - R			L - T - R			L - T - R	
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled	
Rights:	Include			Include			Include			Include	
Lanes:	0	0	1! 0 0	0	0	1! 0 0	0	1	0 1 0	0	1 0 1 0
Volume Module:											
Initial Vol:	29	4	39	22	1	16	18	534	19	26	476 27
Grade:	0%			0%			0%			0%	
Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx
Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	32	4	43	24	1	18	20	587	21	29	524 30
Critical Gap Module:											
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg	
Critical Gp:	7.0	6.5	5.5	7.0	6.5	5.5	5.5	xxxx	xxxxxx	5.5	xxxx
Capacity Module:											
Conflict Vol:	1189	1200	315	1222	1195	292	553	xxxx	xxxxxx	608	xxxx
Potent Cap.:	172	189	687	164	190	706	516	xxxx	xxxxxx	483	xxxx
% Used Cap.:	18.6	2.3	6.2	14.7	0.6	2.5	3.8	xxxx	xxxxxx	5.9	xxxx
Impedance:	xxxx	0.98	0.95	xxxx	1.00	0.98	0.97	xxxx	xxxxxx	0.95	xxxx
Actual Cap.:	155	174	687	141	175	706	516	xxxx	xxxxxx	483	xxxx
Level Of Service Module:											
Unused Cap.:	123	170	644	117	174	689	496	xxxx	xxxxxx	454	xxxx
LOS by Move:	D	D	A	D	D	A	A	A	A	A	A
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT	
Shared Cap.:	xxxx	269	xxxxx	xxxx	212	xxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx
Unused Cap.:	xxxx	190	xxxxx	xxxx	169	xxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx
Shared LOS:	A	D	A	A	D	A	A	A	A	A	A

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #29 Sawmill Road and Bille Road

Level Of Service: B

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0 0	0	0	1! 0 0	0	0	1! 0 0	0	0	1! 0 0
Volume Module:												
Initial Vol:	66	2	74	4	5	3	10	255	83	37	224	1
Grade:	0%			0%			0%			0%		
Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Truck/Combi:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	73	2	81	4	6	3	11	281	91	41	246	1
Critical Gap Module:												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	6.5	6.0	5.5	6.5	6.0	5.5	5.0	xxxx	xxxxx	5.0	xxxx	xxxxx
Capacity Module:												
Cnflct Vol:	634	625	417	754	670	248	248	xxxx	xxxxx	372	xxxx	xxxxx
Potent Cap.:	394	436	607	337	412	744	793	xxxx	xxxxx	687	xxxx	xxxxx
% Used Cap.:	18.4	0.5	13.4	1.3	1.3	0.4	1.4	xxxx	xxxxx	5.9	xxxx	xxxxx
Impedance:	xxxx	1.00	0.89	xxxx	0.99	1.00	0.99	xxxx	xxxxx	0.95	xxxx	xxxxx
Actual Cap.:	366	411	607	282	388	744	793	xxxx	xxxxx	687	xxxx	xxxxx
Level Of Service Module:												
Unused Cap.:	293	409	526	278	383	741	782	xxxx	xxxxx	646	xxxx	xxxxx
LOS by Move:	C	A	A	C	B	A	A	A	A	A	A	A
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	462	xxxxx	xxxx	386	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Unused Cap.:	xxxx	306	xxxxx	xxxx	373	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Shared LOS:	A	B	A	A	B	A	A	A	A	A	A	A

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #30 Sawmill Road and Elliot Road

Level Of Service: A												
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0 0	0	0	1! 0 0	0	0	1! 0 0	0	0	1! 0 0
Volume Module:												
Initial Vol:	63	93	6	5	88	33	57	10	115	5	6	7
Grade:	0%			0%			0%			0%		
Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Truck/Combi:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	69	102	7	6	97	36	63	11	127	6	7	8
Critical Gap Module:												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	6.5	6.0	5.5	6.5	6.0	5.5	5.0	xxxx	xxxxxx	5.0	xxxx	xxxxxx
Capacity Module:												
Cnflct Vol:	290	157	201	325	216	18	14	xxxx	xxxxxx	138	xxxx	xxxxxx
Potent Cap.:	616	784	788	588	728	981	1036	xxxx	xxxxxx	900	xxxx	xxxxxx
% Used Cap.:	11.3	13.1	0.8	0.9	13.3	3.7	6.0	xxxx	xxxxxx	0.6	xxxx	xxxxxx
Impedance:	xxxx	0.90	0.99	xxxx	0.89	0.97	0.95	xxxx	xxxxxx	1.00	xxxx	xxxxxx
Actual Cap.:	506	742	788	496	689	981	1036	xxxx	xxxxxx	900	xxxx	xxxxxx
Level Of Service Module:												
Unused Cap.:	436	640	781	490	592	944	974	xxxx	xxxxxx	894	xxxx	xxxxxx
LOS by Move:	A	A	A	A	A	A	A	A	A	A	A	A
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	629	xxxxxx	xxxx	735	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx
Unused Cap.:	xxxx	451	xxxxxx	xxxx	596	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx
Shared LOS:	A	A	A	A	A	A	A	A	A	A	A	A

DOWLING ASSOCIATES
TOWN OF PARADISE GENERAL PLAN UPDATE
PM Peak Hour Existing Conditions

Level Of Service Computation Report
1985 HCM Unsignalized Method

* Base Volume Alternative *

Intersection #32 Sawmill Road and Pearson Road

Level Of Service:

C

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0	0	1! 0 0	0	0	1! 0 0	0	0	1! 0 0	0	0	1! 0 0
Volume Module:												
Initial Vol:	16	17	3	100	15	31	18	309	29	3	201	61
Grade:	0%			0%			0%			0%		
Cycle/Cars:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Truck/Comb:	xxxx	xxxx		xxxx	xxxx		xxxx	xxxx		xxxx	xxxx	
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	18	19	3	110	17	34	20	340	32	3	221	67
Critical Gap Module:												
RT Rad/Ang:	20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg			20.0 ft/90.0 deg		
Critical Gp:	6.5	6.0	5.5	6.5	6.0	5.5	5.0	xxxx	xxxxxx	5.0	xxxx	xxxxxx
Capacity Module:												
Cnflict Vol:	718	667	388	672	650	322	288	xxxx	xxxxxx	372	xxxx	xxxxxx
Potent Cap.:	353	414	629	375	423	681	756	xxxx	xxxxxx	687	xxxx	xxxxxx
% Used Cap.:	5.0	4.5	0.5	29.3	3.9	5.0	2.6	xxxx	xxxxxx	0.5	xxxx	xxxxxx
Impedance:	xxxx	0.96	1.00	xxxx	0.97	0.96	0.98	xxxx	xxxxxx	1.00	xxxx	xxxxxx
Actual Cap.:	320	404	629	351	413	681	756	xxxx	xxxxxx	687	xxxx	xxxxxx
Level Of Service Module:												
Unused Cap.:	303	385	626	241	396	647	737	xxxx	xxxxxx	684	xxxx	xxxxxx
LOS by Move:	B	B	A	C	B	A	A	A	A	A	A	A
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	372	xxxxxx	xxxx	398	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx
Unused Cap.:	xxxx	332	xxxxxx	xxxx	238	xxxxxx	xxxx	xxxx	xxxxxx	xxxx	xxxx	xxxxxx
Shared LOS:	A	B	A	A	C	A	A	A	A	A	A	A

TOWN OF PARADISE

1994 GENERAL PLAN

VOLUME III ENVIRONMENTAL SETTING DOCUMENT

APPENDIX E

APPENDIX E

LAND USE GUIDELINES FOR SAFETY COMPATIBILITY ONLY

(Noise Compatibility May Vary
Within Each Safety Area)

<u>Land Use Category</u>	<u>Compatibility with Safety Areas</u>
<u>Residential</u>	1. Clear Zone 2. Approach Zone 3. Overflight Zone
Single Family	1. No 2. Yes (1) 3. Yes
Multiple Family Dwellings	1. No 2. No (2) 3. Yes (3)
Mobile Home Parks or Courts	1. No 2. No (2) 3. Yes (3)
Transit Lodging, Hotels, Motels	1. No 2. No (2) 3. Yes (3)
<u>Industrial Manufacturing</u>	
Chemicals and Allied Products	1. No 2. No 3. Yes (3)
Petroleum, Refining and Related Industries	1. No 2. No 3. Yes (3)
Rubber and Miscellaneous Plastics	1. No 2. No 3. Yes (3)
Miscellaneous Manufacturing	1. No 2. Yes (3) 3. Yes (3)

Warehousing, Storage of Non-Flammables

1. No (6)
2. Yes (3)
3. Yes

Transportation, Communications, and Utilities

Railroad, Rapid Rail Transit

1. No (6)
2. Yes
3. Yes

Highway and Street

1. No (6)
2. Yes
3. Yes

Auto Parking Lots

1. No (6)
2. Yes
3. Yes (3)

Utilities

1. Yes (4)
2. Yes
3. Yes

Other Transportation, Communications, and Utilities

1. No (6)
2. Yes
3. Yes (3)

Commercial/Retail Trade

Wholesale Trade

1. No (6)
2. Yes (3)
3. Yes (3)

Building Materials, Retail

1. No (6)
2. Yes (3)
3. Yes (3)

General Merchandise, Retail

1. No
2. No (2)
3. Yes (3)

Food, Retail

1. No
2. No (2)
3. Yes (3)

Automotive

1. No
2. Yes (3)
3. Yes (3)

Eating and Drinking Places

1. No
2. No (2)
3. Yes (3)

Other Retail Trade

1. No
2. No (2)
3. Yes (3)

Personal and Business Services

1. No
2. Yes (3)
3. Yes (3)

Public and Quasi-Public Services

Cemeteries

1. No
2. No
3. Yes (3)

Other Public and Quasi-Public Services

1. No
2. No
3. Yes (3)

Outdoor Recreation

Playgrounds, Neighborhood Parks, Camps

1. No
2. No
3. Yes (3)

Nature Exhibits

1. No
2. Yes (3)
3. Yes (3)

Spectator Sports, Including Arenas

1. No
2. No
3. Yes (3)

Golf Courses, Riding Stables

1. No
2. Yes (3,5)
3. Yes (3,5)

Auditoriums, Concert Halls

1. No
2. No
3. Yes (3)

Outdoor Amphitheaters and Music Shells

1. No
2. No
3. Yes (3)

Resource Production, Extraction and Open Space

Agriculture Except Livestock

1. Yes
2. Yes
3. Yes

Livestock Farming, Animal Breeding

1. No
2. Yes
3. Yes

Forestry Activities and Related Services

1. No
2. Yes
3. Yes

Mining Activities

1. No
2. Yes
3. Yes

Permanent Open Space

1. Yes
2. Yes
3. Yes

Water Areas

1. Yes
2. Yes
3. Yes

Exhibit 2 Notes:

- (1) Single family residential is a compatible land use within the approach zone only if the population density is not more than one single family resident per 5 acres within 1 mile of the runway end, subject to ALUC review.
- (2) Use not compatible in approach zone within 1 mile of the runway end. Use subject to ALUC review if more than 1 mile from the runway end.
- (3) Uses subject to ALUC review if they result in large concentration of people underneath downwind and base legs or departure paths of frequently used airport patterns. Threshold for review of "large concentrations" is on the order of 25 people per acre for non-residential uses or more than 4 units per acre for residential uses.
- (4) No above-grade transmission lines, no on or above-grade gas or oil pipe lines.
- (5) Equestrian activity including riding trails is not compatible with areas overflown by low flying aircraft as horses may be frightened by aircraft.
- (6) Intensive development in a clear zone is prohibited. All specific development plans must be reviewed by the ALUC to assure that temporary or permanent concentration of people greater than 25 people per acre are avoided, that storage of concentrations of hazardous material will not occur, and that the local public agency will be able to effectively provide emergency services to the parcel.

TOWN OF PARADISE

1994 GENERAL PLAN

VOLUME III ENVIRONMENTAL SETTING DOCUMENT

APPENDIX F



APPENDIX F

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TOWN OF PARADISE

1994 GENERAL PLAN

VOLUME III ENVIRONMENTAL SETTING DOCUMENT

APPENDIX G



APPENDIX G

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